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THE

CLASS MAMMALIA

ARRANGED BY THE

BARON CUVIER,

WITH

SPECIFIC DESCRIPTIONS

BY

EDWARD GRIFFITH, F.L.S., A.S., *&c.*
AJOR CHARLES HAMILTON SMITH, F.R.S., L.S., *&c.*
AND
EDWARD PIDGEON, Esq.

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ANIMAL KINGDOM

ARRANGED IN CONFORMITY WITH ITS ORGANIZATION,

BY THE BARON CUVIER,

MEMBER OF THE INSTITUTE OF FRANCE, &c. &c. &c.

WITH

ADDITIONAL DESCRIPTIONS

OF

THE SPECIES HITHERTO NAMED, AND OF MANY NOT BEFORE NOTICED,

BY

EDWARD GRIFFITH, F.L.S, A.S.

AND OTHERS.

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PREFACE.

IT is scarcely necessary to remind the Public that we possess no complete and compendious work on zoology in our language commensurate, at least, with the modern improvements and discoveries in that science. And that while the naturalists of the continent have been zealously and rapidly enlarging the extent, and determining the limits of the various departments of the animal kingdom, we have evinced but little solicitude to participate in their labours or to emulate their acquirements.

The attempt to supply a work of this description, and to excite, if possible, a little more attention to this very interesting subject, cannot, it is presumed, require apology. With this view it was originally intended that the present book should have been presented to the Public in an original form; but upon consideration that the system almost altogether, as well as much of the materials would be derived from the illustrious naturalist to whom the science of organized nature is so deeply indebted, it was

thought better to translate the whole of his compendium of zoology, the "Regne Animal," and to make such additions to it as might appear requisite to render the present work not merely useful to the naturalist as a book of pure science, but also interesting at large as a general zoological biography, and ornamental as containing original and well-executed illustrations. It was thus proposed to avoid the charge of unacknowledged or repeated plagiarisms on the one side, or of presumptuous temerity on the other.

The propriety of this course will, it is hoped, further appear, when it is considered that the "Regne Animal" of Cuvier itself is little else than a scientific, though partial, catalogue or synopsis of the living tribes, arranged according to the laws of their conformation. It was meant to serve as an introduction to his still more elaborate work on Comparative Anatomy, and intended chiefly for the use of professional students: it is consequently deficient in much popular and entertaining matter relative to the instincts, habits, *&c.*, of animals, and contains only a partial selection of the various species sufficient for the purpose of illustrating the different genera. To supply this deficiency, additional descriptions of all the species will

be here found proportioned in extent to the interest each may offer. Thus while a complete translation is given of the "Regne Animal" with as much closeness and accuracy as the corresponding idioms of the two languages will permit, much that is interesting and important from the pens of other modern naturalists and travellers, and from original sources, will be found subjoined by way of supplement.

It is feared that some repetitions, and perhaps occasional apparent diffusiveness, may have resulted from this plan; they have, however, been avoided as much as possible, and when detected, it is hoped will be deemed venial, if not absolutely necessary.

It may be proper to state here the objects Cuvier had in view in his work on the Animal Kingdom, together with a summary of his labours upon it. This we shall do in his own words.

"I was necessitated," (says the Baron, in the preface to his 'Regne Animal,') "in furtherance of my object, to make anatomy and zoology, dissection and classification, proceed hand in hand together,—in my first remarks on organization, to look for the best general principles of distribution,—to employ those principles in making new observations,

and those new observations in their turn, to carry to perfection the general principles of distribution. In fine, to produce from this action and re-action of the two sciences, such a system of zoology, as might serve for an introduction and a guide in anatomical researches, and such a body of anatomy as might tend to develop and explain the zoological system.

"I by no means, however, intended to carry this twofold labour into all the classes of the animal kingdom; the vertebrated animals naturally claimed a larger portion of my attention in consequence of their superior interest in every point of view. Among the invertebrated tribes, I have occupied myself more especially with the naked mollusca and the larger zoophytes. But the innumerable variations of shells and corals, the microscopic animals, and the other families which play no very apparent part on the theatre of life, or whose organization affords few facilities to the scalpel, did not require to be treated with similar minuteness of detail.

"It formed no part of my design to arrange the animated tribes according to gradations of relative superiority, nor do I conceive such a plan to be practicable. I do not believe that the mammalia and birds placed last, are the most imperfect of their class; still less do I

think that the last of the mammiferous tribes are superior to the foremost of the feathered race, or that the last of the mollusca are more perfect than the first of the anelides or zoophytes. I do not believe this to be, even if we understand this vague term of *perfect*, in the sense of most completely organized. I have only considered my divisions as a scale of resemblance between the individuals classed under them. It is impossible to deny that a kind of step downwards from one species to another, may be occasionally observed. But this is far from being general, and the pretended scale of life, founded on the erroneous application of some partial remarks, to the immensity of organized nature, has proved essentially detrimental to the progress of natural history in modern times.

" In conformity with these views I have established my four divisions of the animal kingdom, which I believe more exactly to express the mutual relations of animal conformation than the old arrangement of vertebrated and invertebrated tribes. For it is obvious that a much greater mutual resemblance exists between the individuals of the former, than of the latter classes.

" In the mammiferous class I have reduced the solipedes to the pachydermata, and have divided

these last into families on a new system. The ruminantia I have placed at the end of the quadrupeds, the sea-cow, among the cetacea. I have varied in some respects, the arrangement of the carnivora. The ouistites I have wholly separated from the simiæ, and I have pointed out an analogy between the pouched animals and other digitated mammalia, entirely according to my own anatomical researches. On the recent and profound labours of my friend and colleague, M. Geoff. St. Hilaire, I have founded my observations on the quadrumana and chiroptera.

" The researches of my brother, M. Frederic Cuvier, on the teeth of the carnivora and others have been of great use to me in arranging the sub-genera. Though the genera of the late M. Illiger are but the results of the same researches and of those of some foreign naturalists, I have generally adopted his names, whenever my sub-genera could be comprehended under his genera; I also eagerly adopted the excellent divisions of M. de Lacepede in this kind; but the characters which I have marked as indicative of all the various degrees, have been all taken from nature, either in the cabinets of anatomy, or the galleries of the Museum.

" I have pursued a similar plan with the birds.

I have examined with the utmost attention more than four thousand individuals of this class in the Museum. For more than five years they have been arranged according to my ideas in the public gallery, and all that I have said relating to them has been drawn from my studies there. Thus any relation between my descriptions and some recent ones from other hands, is purely accidental.

" I trust that naturalists will approve of the numerous sub-genera, which I have thought proper to institute in the birds of prey, passeres and water-fowl. They appeared requisite for the purpose of introducing clearness into the arrangement of these birds, hitherto so complicated. I have also marked as far as possible, the correspondence of these sub-divisions, with the genera of MM. de Lacépède, Meyer, Wolf, Temminke, and Savigny, and referred to each of them all the species of which I possessed authentic information. This labour, fatiguing to myself, will prove useful and agreeable to future investigators of the subject. I have derived considerable pleasure in precisely defining those several species, from many elegant works on ornithology lately published, more especially from those of M. Le Vaillant, and M. de Vieillot.

"The general division of reptiles, by my friend M. Brouguiart, I have thought it right to procure, but I have made very laborious anatomical researches to establish the ulterior subdivisions. On the fishes, it will probably be found that I have done more than in the rest of the vertebrated department. In consequence of the great accessions made to our museum in this way, I have been enabled to add many subdivisions to those of M. de Lacépède: I have also been enabled to authenticate many species noticed by Commerson and other travellers. My division of this class, is perhaps not so convenient for me, but I believe it is more natural than any preceding one, and should another be established more convenient, and equally conformable to organization, I shall be happy to adopt it.

"In the general division of the invertebrated animals, I have pursued the plan formerly indicated in my memoir, in 1795. The classification of the mollusca in particular, on which it is well known, how much labour I have expended, especially on the naked mollusca, depends entirely on my own observations. I have verified every fact furnished by that skilful anatomist, M. Pole, concerning the multivalves and bivalves, and have marked, as I

[redacted], with more precision, the functions of [redacted]ain organs. I have attempted to fix deter-[redacted]nately, the animals to which the various con-[redacted]gurations of shells belong, and to range the latter accordingly. In the ulterior divisions of shells, whose inhabitants mutually resemble, I have chiefly confined myself to a brief sketch of such as are admitted by MM. Lamarck and Montfort. Those few genera and sub-genera which belong to myself, are the result of observation. In this department, however, I do not profess to have observed a similar degree of critical accuracy, as on the vertebrated animals and the naked mollusca.

"The establishment of the annelides as an order, I believe, I may justly claim for myself, although the invention of the name does not appertain to me. I have extricated them from the state of confusion, in which they had been left by former naturalists among the mollusca, the testacea, and the zoophy es; given them a more natural arrangement, and thrown considerable light on their several genera, by the fixed definitions I have made on the subject in the Dictionary of the natural Sciences and elsewhere.

"The Crustacea, Arachnoides, and Insects belong (with the exception of some anatomical

details,) to M. Latreille, who will him[illegible] plain every thing peculiar to his own researc[illegible]

"On the zoophytes, the final division of t[illegible] animal kingdom, I have availed myself of th[illegible] labours of M. de Lamarck, respecting the echinodermata, and of M. Rudolphi's work on intestinal worms, entitled *Entozoa*. I have, however, carefully anatomized all the genera, and fixed some that were hitherto unsettled. The corals and the infusoria presenting but few facilities for anatomical investigation, I have sketched but briefly."

But to return to the subject of the present undertaking. Criticism, to be indulgent must cease to be just: it is in vain, therefore, to deprecate its censures, or to appeal to the motives which induced the work as an excuse for its malperformance.

Still, however, there are points in a work of this nature, on which persons of sound principles in general, and the guardians of the opening minds of others in particular, may demand early satisfaction, and to which, therefore, we shall advert.

Natural history sometimes involves details which if needlessly dwelt on, might prove offensive to delicacy, such unnecessary dilatations have been scrupulously avoided in the following

pages. Another and a more serious charge has been brought against zoological science as delivered to us by the sçavans of Germany and France: it is asserted that it has been made a vehicle for the insidious poison of infidelity. That it has no natural adaptation to such an end is certain, that it has been perverted to such a purpose, is, we fear, too true. Our author at least, in our minds, stands clearly acquitted of such a charge, but as his views of science have been distorted by others to the prejudice of religion, a distortion which has, perhaps, been facilitated by an occasional want of precision in his style, it has been our particular care in every individual instance of such perversion, to show its utter inapplicability to such an end. It is not the heavens alone that "declare the glory of God," nor the firmament only "which sheweth his wondrous works." His omnipotence, his wisdom, and his superintending providence, are equally manifested in the meanest worm that creeps upon the earth, and in the lowest of the radiated tribes that slumber in the coral caves of ocean.

PRELIMINARY SKETCH

OF

THE RISE AND PROGRESS

OF

ZOOLOGY.

That the arrangement of Cuvier, and the modern improvements in Zoology, may be better understood and appreciated, it is proposed to introduce them by a preliminary sketch of the early state and progress of this science, with a very few observations on its importance, utility, and relations, and a brief view of the several systems.

A strict definition of the term Natural History, will be found hereafter, and is, therefore, needless in this place. Zoology is, beyond all doubt, the most extensive, important, and sublime branch of Natural History. It is not confined in its details to a mere dry description of the external forms of animals. It embraces all the phenomena of life and animal motion;

the internal organization of each individual part; the processes of digestion, assimilation, nutrition, secretion, and reproduction; the wonderful instincts, the varied dispositions, and the different degrees of intellectual superiority in the animal world, from the half vegetable zoophyte through innumerable gradations of being up to man himself, the image of the divinity. Let no one pretend to disparage or undervalue a science like this. In such a case, contempt can only be founded on ignorance. "*Damnant quod non intelligunt.*" Wonderful, indeed, are all the works of that divine artist, whom minuteness cannot perplex, or magnitude encumber; but of them all, the most wonderful beyond all comparison, is an organized body possessed of life, motion, sensation, and thought.

The utility of this science will be further apparent, when we consider its relations with several others. The accomplished Zoologist must be well acquainted with human and comparative anatomy; he must be versed in chemistry and physiology. He cannot avoid an acquaintance with geology, since it will be necessary for him to study the fossil remains of animals, and the wrecks of former creations.

It is entirely owing to the study of such remains, that any rational ideas respecting the theory of the earth have been obtained. They alone have enabled philosophers to determine with anything like certainty, the æras of the formation of the different strata which compose our globe, and the consequent age of the earth itself.

Finally, the Zoologist has need of the knowledge of languages, and will succeed but indifferently in the philosophy of his science, without a competent familiarity with the philosophy of the human mind.

Another, and a striking advantage of this science on the mind of the student, is the habit which it induces, of arranging ideas with method and precision. From a study of the various systems of Naturalists, it must infallibly result, that a principle of order and natural connexion, will be introduced into our thoughts on every other subject. It is impossible that a long and close attention to any one systematic pursuit, will not produce a tendency to a systematic accuracy in every other; and, perhaps, in this point of view, the study of Zoology is inferior to no other, not even Mathematics itself excepted.

The object of Zoology, as a science, is to

arrange all known animals under certain divisions and sub-divisions, according to their degrees of affinity or resemblance. The more that such arrangement approaches to the order observed by nature herself, the better. In other words, the more that systems are constructed on the similarity, not only of external, but of internal conformation the better. Yet, perhaps, too much refinement in this way, is sometimes insisted on. It should never be forgotten, that the only, or at all events, by far the principal use of systems is to assist the memory. They are, after all, in a great measure, the arbitrary creations of man, and their object of facilitating retention will not be gained, if simplicity be much lost sight of. The undue multiplication of divisions, must, therefore, prove of most especial detriment to the progress of science. Much has been said about *natural methods;* but it may be questioned whether an artificial method, constructed on simple principles, and not deviating too widely from the general order observable in nature, be not better adapted to answer the purposes of scientific arrangement, than a more complicated, though, perhaps, a more strictly philosophical system. But when we come to examine the methods of celebrated Naturalists,

we shall speak a little more at large on this subject.

It is singular that Zoology, though so decidedly the most interesting and important branch of Natural History, should so long have remained uncultivated as a science. That the animal world must have very early attracted the attention of mankind, is obvious. The close and important relations subsisting between them and other animals, render this point indubitable. Man cast naked and hungry on the earth, and comparatively weak in physical powers, was forced not only to examine the properties of plants, but likewise to observe narrowly the instincts and habits of the brute creation. By such observations, he was led to recognise those substances which were necessary and salutary to his existence, and to distinguish them from what might prove fatal or pernicious. He was forced to resist the carnivorous tribes, and to elude the attacks of venemous reptiles; to seek his clothing and his food by hunting and by fishing, and to tame and associate with him, such animals as were sufficiently docile and intelligent to assist him in his pursuits.

Such, doubtless, was the origin and foundation of zoological science. That it was culti-

vated to some extent by the sages of India, of Egypt, of Chaldea, and other Eastern nations, is much more than probable. In the climes and ages to which we allude, the priests were the sole depositaries of all knowledge. The first naturalists, and the first physicians, were the interpreters of the Divine will, the prophets to whom futurity was unveiled, and the magicians to whom all nature was obedient. No certain testimony can be collected from those ages of darkness, in which the sciences descended from heaven at the command of priests, and were preserved on earth as their exclusive patrimony. Through the fleeting medium of oral tradition, or the mystic garb of symbolical writing, little may be traced with accuracy respecting the progress of science. In India, Egypt, and the East, it flourished only in the shade of temples, and the secrecy of solitudes. Philosophy formed but a part of theology, and the phenomena of nature proved, but too frequently, powerful engines in the hands of the artful, over the ignorant and the superstitious, and, perhaps, occasionally useful instruments for the maintenance of civil order: such is universally the case in the infancy of society.

We may fairly suppose that the study of animals was not altogether neglected by such

men as the ancient Bramins of India, Zoroaster, Hermes Trismegistus, and other eastern philosophers. We may also well suppose, that Moses, who was learned in all the wisdom of the Egyptians, and Solomon who knew every plant from the cedar to the hyssop, had paid some attention to the phenomena of the animal world. This is very clearly proved from the Levitical law, and the various allusions in the Bible, generally, and particularly in the book of Job to this subject. Among the early Greeks, it is more than probable, that such men as Esculapius, Melampus, Chiron, Orpheus, Aristæus, *&c.*, who studied plants and their properties, did not neglect the habits and instinct of animals. The principal sects or schools of philosophy, which cultivated physical sciences, were the *Italian* founded by Pythagoras; the *Eleatic* by Xenophanes; and the *Ionic* by Thales. Heraclitus also distinguished himself in this walk, as did also Anaximander, Anaximenes, and Anaxagoras, the friend of Pericles; but from the *Academic* or *Platonic* school, though by no means distinguished by its attention to physical science, sprung the first man who furnished the world with anything really valuable or methodical on the subject of which we treat.

This was Aristotle of Stagyra, one of the most extraordinary geniuses that, perhaps, the world ever saw. A man, who, in reference to his times, the then state of knowledge, and the means of its cultivation, may be considered as a prodigy of invention, acuteness, and research. He remoulded, as it were, the entire system of human knowledge; ascended to the primary laws of thought, and gave rules of composition to orators and poets, which must be as lasting as their respective arts. He illustrated all the moral and physical sciences, and founded a new philosophy, which reigned for ages with an ascendency unparalleled in the history of the human mind.

This great man was the first to observe and attempt to explain the organization of animals. His book, Περι Ζωων Ἱστοριας, will always be justly regarded as one of the master-pieces of antiquity. It contains in the clearest style a prodigious number of facts and observations. The organization of animals in its divers parts is compared with that of man. Their generation, their habits, their organs, the mechanism of their functions, their relations, their resemblances, and differences, are discussed with astonishing clearness and sagacity. He may be considered to have established a solid basis

for Natural History; and his principal divisions of the Animal Kingdom are so well founded, that almost all of them are still substantially admitted. Nothing can more clearly prove than this circumstance how deeply he had meditated on the subject. In arranging facts, he goes back to causes; from general principles he deduces a multitude of comparisons pregnant with result, and calculated to exhibit his subject under every point of view. The work, replete with luminous speculations and important truths, bespeaks at once the vigour and extent of a mighty genius, and the acuteness of a correct observer, whose opportunities of research, through the liberality of Alexander, have perhaps been seldom equalled. Not to speak of other branches, Aristotle may be considered as, properly speaking, the first Ichthyologist. He has not only collected all preceding observations on fishes, and added a multitude of his own, but he has arranged those animals, and considered them, in a general view, with a discrimination and exactness not less to be admired than the order of his ideas and the simplicity of his diction. It is true he has confined himself to the grander and more marked external distinctions in his classification of fishes.

But this, as well as other defects and errors, which have crept into his Treatise, may justly be considered as belonging to the age in which he wrote; while its merits, which are infinitely more numerous and prominent, may be attributed to himself alone.

It may not, perhaps, be out of place here, just to observe, that, though the Ancients did not attend so much as we do to detail and method, yet their views of the whole, and of general laws, were probably as correct and as philosophical as ours. Their idea was to neglect minutiæ, and to attach to every object in nature no more than its real share of importance. By the total neglect of this maxim, science has, perhaps, been rather overloaded than enriched: we view nature too much with a microscopic eye to embrace her genuine dimensions.

Zoology, as well as other physical sciences, after the time of this great man, languished among the degenerate Greeks. Arts follow the progress of arms, and philosophy and science passed over to the victorious Romans. Never was a finer field opened for the cultivation of Natural History than Rome presented in her "high and palmy state" under her earlier emperors. To the study of Zoology in parti-

cular were the utmost advantages afforded. Animals, rare, valuable, and extraordinary, were transported from all parts of the known world to Rome; and the sports of the circus, while they degraded the *man*, tended to promote a knowledge of the brute.

It does not, however, appear that Zoology was cultivated among the Romans to even a trifling extent, until the time of Pliny. Whether Seneca the philosopher was addicted to this study or not is uncertain. Pliny is, however, the only Roman naturalist worth notice; and though far inferior to Aristotle, there is much in his works of considerable value. Like Aristotle he had an expanded mind and an all-grasping genius; but his powers, though great, were not proportioned to his gigantic enterprises. This much, however, is certain: he may be almost considered as the prototype of Encyclopedists. His object was to embrace the whole empire of human knowledge as it existed in his times—to learn all, to describe all. This vast project to a certain extent, he may be said to have executed. Astronomy, the history of men, of plants, and animals; a description of the liberal and mechanical arts, medicine, antiquities, customs, commerce, navigation—all are to be

found in his voluminous productions. His erudition was equally varied and profound, and his style sublime, simple, and severe. There is also a sustained tone about it, which never falls below the subject, nor suffers the attention to flag. His general views are philosophical, bold, and expansive. Though his work be a compilation, it contains multitudes of original traits, and he depicts the habits and dispositions of animals with wonderful felicity. His performance, in short, with all its faults, must be always considered a rich and valuable storehouse of information, a miracle of erudition, and a model of taste.

To this great praise, however, we must add very great qualification. Like almost every other writer of antiquity, Pliny was too credulous. He was fond of prodigies, and did not attach sufficient importance to such facts as he might himself have verified. He adopted, without examination, many fabulous stories, which had passed current down to the time in which he wrote, and with a spirit of generalizing, in the opposite extreme to the character of our modern writers, he neglected the details which were indispensable to the truth and justice of his speculations. His *History of Quadrupeds* is, perhaps, the best part of his zoological

work, and that of fishes decidedly the worst. He does not even very clearly define what he means by the term *fish*, and the whole book is full of error and confusion.

Ælian is a writer whom it would be difficult to notice, except in terms of censure. He far surpassed Pliny in credulity, or, perhaps, it was his intention to impose upon his readers. He was a Greek sophist, one of a class of men whose profession it was to defend absurdity and falsehood. He has been erroneously confounded with two Ælians, one, who lived under the Emperor Adrian, author of a Treatise on *Military Tactics*; and another who was born at Preneste, and flourished in the reigns of Heliogabalus and Alexander Severus. It appears pretty certain, that the naturalist, concerning whose history we know but little, was a third person of that name. He may justly be considered as the father of all the falsehood and error which disgraced for so long a period the natural history of animals in general, and more particularly that of fishes. His book, like that of Pliny, is a compilation; but utterly unredeemed by any elegance of style or brilliancy of thought. The accounts, taken from various sources, are put together without the least

attention to order or plan. There are, however, some curious details in it respecting the habits of fishes, and a few facts which may be relied on.

It is scarcely necessary to mention the names of Apuleius and Athenæus the grammarian who wrote on fishes. They added nothing to the existing stock of zoological science, and are yet the only names that deserve mention, from the time of Ælian and Pliny, to the commencement of the sixteenth century.

In the commencement of that period flourished Paulus Jovius, a Roman physician; Pierre Belon a physician likewise of Mans, and professor of medicine in the College of France; Rondelet, professor royal of the same art, at the university of Montpellier; and Ippolito Salviani of the same profession at Rome. Of these, all wrote exclusively on fishes, with the exception of Belon, who treated also on birds. Their observations on Ichthyology are excellent, and their labours tended much to extricate the synonymy of these animals from the labyrinth of confusion in which it was involved, and to dissipate the clouds of ignorance and error by which this department of Zoology was peculiarly obscured. The work of Salviani on aquatic animals which was published at Rome in 1554, is superbly illustrated. His

arrangement is dependent on the approximation of external forms, and is of course, in many points, very faulty. Belon was the author who at that time made the closest approach to anything like systematic classification. He has arranged fishes into different groups, some of which, considering the state of knowledge on the subject, are tolerably good. His *Natural History of Birds* is a very remarkable work indeed, for the period in which it was composed. It contains very just and original views on the analogy of structure between birds and mammalia, and especially in the comparison of their respective skeletons.

During the same period, Conrad Gesner, a physician of Zurich, proceeded with great success in the illustration of Zoology in general. His *History of Animals* is arranged in alphabetical order, and is an excellent compilation of all that antiquity has left us on the subject, with many useful original observations, and numerous wood-cuts, for the most part, respectably executed. His knowledge was immense; and he cultivated every part of Natural History. His Treatise on the *Nomenclature of Fishes*, is particularly good. He names more than seven hundred species in Greek, Latin, Italian, Spanish, French, German, and sometimes English.

He atones for the necessary vices of his alphabetical classification, by a secondary method, which consists in giving in succession the ancient and modern names, the form, the habitat, the anatomical peculiarities, the uses, the habits, and finally, the mythological history of each fish described. In his *History of Birds* similarly arranged, there is also much erudition displayed, and many excellent remarks upon those species peculiar to the Cantons of Switzerland. We may mention now, by the way, that a work on Insects published by Dr. Mouffet, an English physician in 1634, was the joint production of Gesner and other great Naturalists of note, at that period.

Aldrovandus may be considered, as probably the most laborious compiler that ever existed. After the protracted labour of sixty years, he left behind him fourteen folio volumes on Natural History. As most of these were published by his successors, we may consider him, though born in 1525, as appertaining rather to the seventeenth than to the sixteenth century. Buffon speaks in terms of praise of this compilation of Aldrovandus, as to the quality of materials, the plan, the divisions, and the painful exactness of the descriptions. He grants, however, the great admixture of fable, and the

overwhelming prolixity of the performance. The Baron characterizes it as an ill-digested collection, and troublesome to consult.

Of Johnston's performance we shall say nothing, but that it is a servile abridgment from Gesner, Aldrovandus, *&c.*, without a particle of new matter, but full of all the errors of his predecessors. His book, however, published at Amsterdam in 1657, is no unfavourable specimen of the engraving of those days ; but many of the figures are incorrectly drawn, others fabulous.

But we must not pass in silence such men as Redi and Swammerdam, to whom entomology is so much indebted, though we can only afford to name them. Nor must we neglect our countrymen Willoughby, and John Ray who was the first naturalist from the time of Aristotle, who produced anything like a scientific arrangement. His system we shall notice hereafter; suffice it to say at present, that he proved the principal guide to the labours of Linnæus. In the compositions of his friend and pupil Willoughby, he is supposed, with just foundation, to have had an ample share. The latter wrote on Ornithology and Ichthyology. His four books on the *History of Fishes*, were revised, corrected, and augmented by Ray, and published by the order and at the expense of

the Royal Society, in two volumes folio, in 1685. This work not only speaks of fishes in general, but treats of all the known species, and describes them in a systematic order. In short, these two naturalists, perhaps we ought to say Ray only, may be considered as the first true systematic zoologists; as the first originators of that mode of treating the subject which has eventually raised Zoology to the rank of a science. The works of Ray under his own name are, *Synopsis Methodica Animalium Quadrupedum et Serpentum*, 1683, octavo; *Synopsis Methodica Avium et Piscium*, 1713 (published after his death); as also was his *Historia Insectorum*.

We now arrive at an era in which a new and enlightened mode of philosophizing led to the most brilliant discoveries and unparalleled extension of science, in which every branch of human knowledge has made the most rapid strides, and in which the errors of ignorance and the reveries of fancy have given way to the spirit of philosophy and the love of truth. Such we believe is, in most particulars, a correct character of the eighteenth century. The harbinger of this era was one of those extraordinary men which nature seems to have sent periodically into the world to alter the face of

things. Francis Bacon, born towards the end of the sixteenth century, was the destined instrument of this wonderful reformation. He it was who laid the foundation of a new edifice of the science, and pointed out the mode in which the superstructure should be finished. He awakened Europe to the necessity of emancipating her mind from the chains of the peripatetic; pointing out the path to posterity, he himself opened the wide field of nature, and taught the art of making discoveries in every region of her illimitable empire. The sciences received a new impetus, and started forward with unexampled rapidity for the goal of perfection. They soon became a chief element of the prosperity of nations and the bulwark of their civilization. Passing from the hands of mere speculators, they became more immediately applicable to the common uses of social life.

Natural History was more especially benefited by the speculations of this great philosopher. It received a form more worthy of its object, a spirit and character more profound, and resting on the basis of experiment and observation; every branch of it was cultivated with rival ardour by a multitude of illustrious observers. Zoology, Botany, and Mineralogy,

could soon boast of a crowd of authors equally distinguished for genius and research. In the front of these stands a name that can never perish but with the destruction of these sciences themselves—the immortal LINNÆUS!

The name of Linnæus is not unworthy to stand beside that of Aristotle himself. His powers of invention and discrimination were scarcely inferior to those of the Stagyrite; his imagination, lively and fertile in the highest degree, was yet always under the control of the soundest judgment, and regulated by the strictest attention to systematic laws. He was distinguished by a most retentive memory, a most unremitting application, the greatest perseverance, and the most ardent devotion to the cause of science. Very early in life did he adopt the gigantic design of entirely reforming and re-arranging the history of all natural productions, and he prosecuted it with untiring vigour to the close of his existence. On Natural History he bestowed a degree of perfection to which it had never attained before. He possessed the happiness, during his own life, (a circumstance very unusual with the founders of systems), of seeing his own method eventually triumphant over the most inveterate oppo-

sition, and almost universally received. To the most numerous and malignant invectives he never offered a reply—nor was this through false pride, for no man was ever more ready to acknowledge the merits of another, or less partial to his own defects. He well knew that every artificial classification must of necessity be more or less imperfect, and that every system must finally rest upon its merits as a whole. He, therefore, determined neither to sacrifice time nor degrade science by personal controversy—an example which might well have been imitated by many of his successors.

Little are those persons acquainted with Linnæus, who consider him merely in the light of a nomenclator. His expanded genius led him to take the noblest and most elevated views of nature. He observed with the most wonderful delicacy and sagacity the subtlest affinities of all organized beings; their interior and most secret resemblances he seemed to discover almost by intuition. But this is only a proof how deeply he had meditated on the laws of nature. He penetrated with a glance into causes which were the least obvious on the surface, and seized at once on those delicate shades of distinction which had escaped the

most acute observers. The general character of his works is order, precision, clearness, exactitude of description, and an accurate knowledge of relations in detail. From the depths of obscurity his genius summoned him to the study of nature, and initiated him into her most secret mysteries. He was the first to give form and order to the shapeless chaos in which naturalists had left the history of nature. He undertook the task of describing all the known productions of his time, and of classifying them according to a simple method, by which they might individually be recognised in case of need. Instead of indulging in a complete description of each being, he was contented to give the most prominent traits the most precise and essential characters. He co-arranged all bodies according to their analogies, that he might thus be enabled to present a clear and intelligible miniature of the three kingdoms of nature.

It has been usual to extol to the skies the eloquence of certain writers, and sometimes, we apprehend, for the purpose of depreciating Linnæus in this particular. But the fame of one great man can never be increased by an attempt to depreciate another. In fact, the style of Linnæus does not form one of the least

of his recommendations. He possessed the happiest command of language, and was equally happy in its application to his subjects. Precision and conciseness were its most frequent and prominent merits. He knew well that a flowery rhetoric was not the proper vehicle of scientific detail; but no one could be more eloquent and animated than Linnæus when occasion called or the subject permitted. As fine descriptions may be selected from his works as, perhaps, from those of any modern author; it is only necessary to consult the *Flora Lapponica* to prove the truth of this assertion.

One of the greatest merits of Linnæus, and which must not be overlooked here, is a strain of the most natural and unaffected piety, equally free from fanaticism and superstition. Unlike some inquirers, he was not made an Atheist by his researches into nature. On the contrary, by the constant habit of contemplating her wondrous energies, and scrutinizing her complicated operations, his thoughts were continually elevated to the sublime Artist of all. He did not attribute the production and support of the universe to fate, to chance, to generative force, or to any of those unmeaning words, with which a false philosophy delights

to juggle. He knew with the Platonic poet, that

> ——— Maria ac terras cœlumque profundum
> Lucentemque globum lunæ, Titaniaque astra
> Spiritus intus alit; totamque infusa per artus
> Mens agitat molem et magno se corpore miscet.

To sum up the merits of this great man: as he was the first who truly raised Natural History to the rank of a science, so under his auspices it flourished with the most unexampled rapidity. In his native country it was cultivated to a degree unknown elsewhere. His pupils carried it into every country of Europe, disseminating the system and celebrity of their master, and raising monuments to their own fame. He had the satisfaction of seeing his writings triumph over bigoted contempt, over interested opposition, and over national prepossessions. He lived to see public institutions established in various countries for the cultivation of Natural History, and had the satisfaction to reflect that it was himself who had raised the science to that degree of estimation which it merited from mankind.

Nothing can so much tend to exalt our opinion of Linnæus, as the number and distinction of those men who were either educated under

his auspices, or so closely associated with him, that they might in some sort be considered his disciples: such was Artedi, his celebrated friend and countryman, who was the first systematic author after Ray on Fishes. It was he who properly laid the foundations of Ichthyology, and invented the nomenclature which is still followed. He first divided fishes into orders and genera, and pointed out the true characters on which these groups should be established. John Christian Daniel Schreber, Professor of Natural History at Erlangen; John Christian Fabricius, the celebrated Entomologist; Peter Kalm, whose travels into North America contain many valuable accessions to Natural History in general, and were translated by the celebrated Forster, were among his pupils. Frederic Hasselquist, a truly meritorious traveller, who brought a vast collection of preserved animals, *&c.*, from the East, and died in the thirtieth year of his age, after rendering considerable service to science, was another. So also were Osbeck, the celebrated Sparrman, Rolander, Falk, whose travels contain much that is interesting to Natural History; A. R. Martin, and Solander, a name so well known in this country; and many more, whose names alone our limits will not even permit us to mention.

But another splendid luminary of natural sciences, cannot be passed over in a sketch like the present. The reader will easily anticipate the name of Buffon, a name which is, in itself, an ample eulogium. This great genius clothed Natural History in a new dress, and decorated it with the attractions of an eloquence unrivalled in his own, or, perhaps, in any other language. He was the first who extended the sphere of its popularity, by the charms of his style, beyond mere scholars and men of science; his naturally expansive mind, and love of sublimity, led him rather to the contemplation of generalities than details. He was also occasionally carried by the force of his imagination, into hypotheses that rested on no solid foundation. He had, nevertheless, a truly philosophical spirit, could observe facts, and compare results, and possessed the most extensive degree of information. His genius was of a very different character from that of Linnæus. To the latter belonged clearness, method, admirable precision, and wonderful acuteness of observation, and research; but the genius of Buffon, was adapted to generalize and enlarge our views of things. While the one is perpetually aiming at order, exactness, and the developement of details, the other is

contemplating nature in all her wild magnificence, and neglects particularity, that he may emorace a more extensive scope. Might we dare to find fault with either of these great men, we would say, that Linnæus was, sometimes, almost too methodical and dry; while Buffon, on the other hand, sometimes departs too much from order, and is too much prone to fanciful speculations: but the fact is, that such faults are almost necessarily connected with the peculiar perfections of their respective genius. It is too much to demand of human nature, a combination of the greatest, and at the same time, most opposite qualifications in the same individual. The four great naturalists, on whose merits we have principally dwelt in this little sketch, have each of them exhibited nature under a different aspect. Aristotle has shown us the profound combination of its laws; Pliny, its inexhaustible riches; Linnæus, its wonderful details; and Buffon, its majesty and power. Let us then be contented to take advantage of these different views, instead of invidiously dwelling on the defects of four writers, who may justly be considered the fundamental pillars of Natural History.

Buffon was assisted in his great work by

Daubenton, one of the first comparative anatomists of his time. Daubenton, however, was very inferior to his friend in the graces of eloquence and in philosophical expansion of mind. His style of writing was neither remarkable for elegance or perspicuity, still his assistance was of the utmost value from his profound practical knowledge and deep scientific research.

On the whole one may pronounce the work of Buffon, with all its faults, to be one of the most valuable accessions that Natural History ever received. It contains such a picture of nature as was never given before or since by the pen of any individual: independently too, of the actual merit of his book, Buffon had the happiness of bringing the cultivation of the science more generally into fashion than it ever was before. Under his auspices, it took a higher flight than ever, and the minds of his countrymen received a universal bent towards this study. There can be no doubt, that the perfection to which Natural History generally, and Zoology in particular, have arrived in France, is to be mainly attributed to the labours of this illustrious writer.

To notice, even superficially, all the writers on Zoology, contemporary with and subse-

quent to Linnæus and Buffon, would be impossible within the limits of a moderate volume; much less can we pretend to attempt the execution of such a task in a brief sketch like the present. We must content ourselves with scarcely more than naming some of the principal, and giving a general view of the progress of the science, during the period to which we have alluded.

The *Animal Kingdom* by Brisson, was published in Paris, in 1756, divided into nine classes; it came out in one volume quarto, containing only the quadrupeds and cetacea: the *Ornithology*, however, of this writer, is his most valuable work, for the minute exactness of his descriptions. Among those who contributed most largely to the stock of zoological science, was the celebrated Pallas. His work on some new species of *Glires*, is very valuable; his *Spicilegia Zoologica* and *Miscellanea Zoologica*, are replete with interesting matter. His travels through the Russian Empire, are full of the most valuable zoological information, as likewise are many of his memoirs, published in those of the Academy of St. Petersburg; in short, he was a most accomplished naturalist. We may also cite, as belonging nearly to the same period, Erxleben's work on the

Mammalia, Audebert's finely illustrated Natural History of Apes and Monkeys, and his *Oiseaux Dorés*, and the labours of the elder Gmelin, who, like Pallas, travelled in the service of Russia, and whose work is full of excellent and numerous articles on Natural History. Of the edition of the *Systema Naturæ* of Linnæus, by the younger Gmelin, we cannot speak in any terms of praise; it is a confused and indigested performance, got up without knowledge or discrimination. It is, notwithstanding, useful, as it contains the only table that is at all complete, of what was done in Zoology towards 1790.

This science has not been cultivated with equal assiduity and success by all the nations of modern Europe. The Swedes and Germans have rather more addicted themselves to boany and mineralogy, than to Zoology; yet both nations, and more especially the latter, have produced most able zoologists, of which, in addition to what we have already said, it is only necessary in this place to mention the names of Illiger and Blumenbach. Our own country, though, at least, for a long period, this science could not boast among us of the general popularity it deserved, has, nevertheless, produced zoologists of as great abi-

lity as any other. It produced, as we have already seen in Ray, the first writer who adopted anything like a rational system, and to whom Linnæus has been very deeply indebted. The first observer, with whom the physiological part of Zoology might be said to have commenced, was our countryman the immortal Harvey. He was the first opposer of the doctrine of equivocal generation, and his maxim of "*omnia ex ovo*," encountered almost as many dissenting voices at first, as did his subsequent glorious discovery of the circulation of the blood. Need we do more than mention the names of Edwards, of Shaw the traveller, of Pennant, and of Hunter, not to name the meritorious existing cultivators of the science?

Our travellers have highly distinguished themselves in supplying materials for this department of knowledge. Bruce, Cook, Foster, who, though not an Englishman, may be in some sort regarded as belonging to us; Garden, who was a correspondent of Linnæus; Grew, principally however celebrated for his discoveries in vegetable physiology; Latham, who so enriched ornithology, with new species; Lister whose work on *Conchology*, contains a great number of valuable plates, and whose

history of the animals of this country is exceedingly meritorious for the times in which it was written; Marsham, Russel, Sloane, White, *&c.* Of these, and many more distinguished men, who have directly or indirectly contributed to the advancement of Zoology, England may be proud to boast.

Still it must be confessed (and it is with shame and regret we feel obliged to confess it,) that the science has not met with that degree of encouragement among us, which it ought to have done. We have always possessed men of the first-rate scientific abilities; but it is not reasonable to expect that such men will devote their time and attention to a study that brings no profit, and but little present reputation.

We do not say that this is precisely the case at present; on the contrary, we hope and trust that a spirit of inquiry into animated nature, has been thoroughly awakened among us, and that we shall soon tread as closely on the heels of our continental neighbours, in this particular department of science, as we outstrip them in some others. But this hope, we still fear, will be vain, until the liberal spirit of our government be directed into this peculiar channel; until its sanction be

efficiently afforded to public institutions for the cultivation of natural science; until every facility be afforded for the prosecution of the study; until we have national menageries worthy of the name; and until the profession of the naturalist shall be raised into a source of respect and emolument *.

The local, colonial, and commercial advantages that England possesses, the high interest and utility of the science, in fine, the national honour, all call for this consummation, so devoutly to be wished, and we heartily trust the call will not be long in vain.

Holland and Switzerland have contributed not a little to the advancement of this branch of science. Spain appeared for a while to start from her long indifference for Natural History, and produced some celebrated botanists in the new world. But the only Spanish zoologist worth naming, is Don Felix Azara, whose researches on the animals of Paraguay are excessively valuable. The Portuguese, the Danes, the Poles, and the Russians, have cultivated Natural His-

* The recent loss Zoology has sustained in one of her most accomplished practical cultivators and liberal patrons, Sir Thomas Stamford Raffles, will not, we trust, long impede the advances she seemed likely to make under his powerful auspices.

tory in general, much less than the other nations of Europe, a fact which is evidently the result of their political constitution, for human knowledge invariably follows the fate of empires, and the degree of civilization.

But it must be owned, in spite of every rival feeling, that France is the country of all Europe, which, in our times, has given the strongest impulse to the progress of natural science in general, and of Zoology in particular. It would be foreign to our purpose, to speak of the success with which this indefatigable and enlightened nation has cultivated botany, mineralogy, and other physical sciences; but it cannot be denied, that for the most perfect zoological methods we are indebted to Frenchmen.

One of the greatest merits attached to France on this point is, that the sciences have been cultivated with the most untiring enthusiasm, amid political tempests that have shaken her to her very centre, amid the tumult of war, and the intoxication of conquest, and under the saddest reverses of fortune.

We will proceed with our brief view of the progress of Zoology under these great men, from the time of Pallas and Buffon.

The united efforts of those two philoso-

phers, certainly contributed more than anything preceding to inspire a general interest for zoological studies, and their effects soon became sufficiently obvious. The period which has elapsed from their times, to the present day, has abounded more in labours on the Animal Kingdom, than any which ever went before.

The class of quadrupeds, has certainly not received any great accessions, if we except *Shaw's Zoology of New Holland,* and the species given from time to time, by Schreber. Audebert's work we have noticed, for its magnificence and expense. In the description of the menagerie of the Museum of Paris, are some fine figures of quadrupeds. The labours of M. Geoffroy on the pouched animals, are of great value. Peron has brought many new quadrupeds from New Holland to France, and Leschenault from the Island of Java. Buffon proposed to terminate his labours with the history of the Cetacea, but was prevented by death. It is the least to say, that he found a most worthy successor in the late Count de Lacepède.

To our countryman Latham, ornithology is indebted for the largest augmentation of its catalogue. Several expensive works have

been published in France on this subject, remarkable for the beauty of the illustrations. Le Vaillant's work on the *Birds of Africa*, contains many new species, and interesting observations; as do his works on *Parrots, Birds of Paradise, &c.* In Germany, ornithology has been much advanced by Messrs. Wolf and Meyer, and the figures published by Borkhausen, Lichthammer and Becker, are possessed of merit. M. D'Azara, whose excellent history of the quadrupeds of Paraguay, we have already noticed, has given also, in the two last volumes of his *Travels in South America*, a history of the Birds of Paraguay.

Elegance of illustration, has been displayed upon a class of animals, apparently but little susceptible of its exhibition. Daudin in France, has given, beautifully executed, figures of frogs, toads, *&c.*, and our own countryman, Dr. Russel, has published the serpents of the coast of Coromandel, with considerable magnificence of style.

Herpetology, or the study of reptiles, a class of animals for a long time neglected, owes much to the labours of Lacepède, Daudin, and Schneider.

Eliezer Bloch published a magnificent work

on *Fishes*, remarkable for the beauty of its coloured figures, and the great number of the new species therein described; but this branch is most indebted to Messrs. Lacepède, and Dumeril, and finally, to the Baron himself.

The immense class of insects, has probably given rise to the greatest number of researches, and of works. To enumerate even the titles would be impossible: we may mention, however, the *Fauna Etrusca* of Rossi; the *Suecica* of Paykull; a similar work on the *Insects of Germany*, by M. Panzer; the *Entomology of Switzerland*, by M. Clairville; that of our country, by Marsham; the *Insects of Guinea and America*, by M. de Beauvois.

Among the descriptions of certain families of the insect world, we may notice the butterfly, by Cramer, Angramelle, Esper, and especially Hübner. The iconography of the hemiptera by Stoll, and of the crustacea by Herbst. The bees of England, by our countryman Mr. Kirby, who, in conjunction with Mr. Spence, has favoured the world with an excellent introduction to entomology; but on the subject of bees, the labours of M. Huber, have, beyond all others, claims to the highest attention; nor

must we omit again mentioning M. Latreille, on the subject of entomology.

If we omit to mention many names even of distinction among our own countrymen, or foreigners, it must not be imputed to neglect or depreciation of their merits; but the utter impossibility of making a complete enumeration in an imperfect sketch like the present, or of giving to such a sketch the character of a regular history of Zoology.

The naked mollusca, those which inhabit the interior of shells, the worms, and zoophytes had experienced considerable neglect. The interest and variety of their structure, did not countervail with the great majority of naturalists, the difficulty of collecting and preserving them.

On the testacea, however, of both the Sicilies, a magnificent work was published by Pali, in which their anatomy is described and drawn with much correctness, and altogether, a new light is thrown on their physiology. But, by far, the most valuable researches on this subject, have proceeded from the Baron Cuvier, who has discovered many new species, explained their external structure, and rectified, through the medium of anatomy, a number of erroneous opinions

formerly entertained concerning those that were known.

Gætze, Werner, Fischer, Bloch, and Rudolphi, have greatly extended our knowledge of intestinal worms, creatures so remarkable from the necessity which obliges them to inhabit the interior of other animals.

There have been always much fewer general works in the animal, than on the vegetable kingdom, and the reason is obvious; animals in number, complication, and diversification of structure so immeasurably exceed plants, as to render it most difficult, if not absolutely impossible for one man to bestow a sufficient study on them all. To speak of the execution of any of these works, would, in us, be deemed invidious, and anything we have to say, respecting their methods of arrangement, must be reserved for that particular part of our subject.

Animals more seldom present us with new objects of utility than vegetables, because we have much less power over them, and are more destitute of the means of appropriating their existence to our peculiar uses. Still, during the period of which we speak, both the food and raiment of mankind, might have been augmented by new discoveries in the ani-

mal world. Some of the animals of New Holland might have propagated in our woods and plains, and constituted an wholesome and agreeable variety in diet. Animals have been discovered in South America, whose fur was well adapted to form new and valuable articles of commerce.

But it is to the philosopher that the animal world opens the grandest scene of contemplation, and the most fertile subjects of profound meditation. The habits of animals, the peculiar processes of their instincts, merit the closest attention, and require no small degree of sagacity to be properly developed. The bee, for example, so long the admiration of naturalists, of poets, of philosophers, and men of education of every kind, was still not completely known, until M. Huber, with a keenness of intellectual vision, which has well compensated his corporeal privation, revealed to us all the secrets of the government of the hive, and the whole system of political economy observed in that celebrated republic.

There are few properties more remarkable, than that discovered by Spallanzani in the bats, the power of directing their course in obscurity, of threading all the windings of their subterraneous habitations, and evading every obstacle,

without the use of vision. They seem enabled to perform this, by the delicacy of the sense of touch spread over the enormous surface of their ears and wings, and the extreme fineness of their sense of hearing.

The faculty of reproducing parts cut off, so remarkable in the armed polypus, and so famous from the experiments of Trembley, is not much less strongly manifested in the actiniæ, and other zoophytes, according to the Abbé Dicquemare: its existence in the crab, has been long known. From Spallanzani and Bonnet, we learn to what a degree it extends in the aquatic salamanders and snails. Broussouet has proved that it is nearly as much extended as in fishes.

Bonnet had discovered in the pucerons, the faculty of being fecundated for many generations by a single connexion. M. Irvine has observed it carried still further, in certain of the monoculi.

The state of lethargy, more or less profound, in which some animals pass the cold season, is another property well worthy the attention of the philosopher. This has given rise to the most interesting discussions and researches, and if we are not exactly acquainted with the causes of so singular a phenomenon, we at

least know all the circumstances which precede, accompany, or interrupt it. It was made a prize question in France, and from the observations of several of the competitors, added to those of Spallanzani, towards the close of his life, it appears that the perfect lethargy is accompanied with a total suspension of respiration, of motion, of sensibility, and digestion. Circulation is excessively slow, and nutrition and transpiration reduced almost to nothing. The blood appears to quit the extremities, and inflate the abdominal vessels.

The only proximate cause, or, as it is scientifically termed, *condition* of lethargy, is cold, and the absence of irritating stimuli. These may even counteract the action of cold; and this is the reason why, in domestication, many of these animals never fall into the lethargic state, and that, on the contrary, others require a greater degree of cold to prevent them falling into that state, while absolute rest and pent air cause them to lethargize much sooner. Too sharp a degree of cold acts upon them as an irritating cause, and awakes them. During the lethargic state their natural heat rises but little beyond the mean temperament of the air; but if awakened, they speedily recover their usual heat let the weather be ever

so cold; but if they are suffered to sleep at some degrees below Zero, they are frozen to death.

In these facts we find evident proofs of the influence of the external irritants in maintaining the activity of the vital system, and we also find evidences equally clear, that life may continue to subsist under the most excessive relaxation of its movements.

The peculiar circumstances of organization which predispose those animals to the lethargic state during winter are as yet very obscure.

Vipers and rattle-snakes were considered from time immemorial to possess a power of fascinating, or attracting within reach, the little animals on which they prey. This Dr. Barton, of Philadelphia, has proved to be a popular error. The rattle snake catches in this manner those little birds, *&c.*, that nestle near the ground, in consequence of their approaching too near in the motions they make to defend their little ones.

The galvanized electricity emitted by certain fishes constitutes one of the most singular phenomena of nature. The wonderful degree to which it exists in the Gymnotus of Guiana has been described by M. de Humboldt; and M.

Geoffroy has described the organs in which it is produced in the Silurus of the Nile.

It would be unpardonable to pass over in this brief notice the mention of a work which has contributed so much to the progress of zoological knowledge, as the annals of the Museum of Natural History in Paris, or that of our own *Philosophical* and *Linnæan Transactions*, to which, however, no praise of ours can give an additional lustre.

We now conclude this historical sketch of the progress of the science to proceed to a brief notice of the principal methods, entreating our readers to pardon the imperfections to which the immensity of the subject, the slenderness of our abilities, and the narrowness of our limits, have necessarily exposed us.

It is obvious on the slightest view of the subject, that the immense number of various objects embraced by natural history could never be retained in the memory without an arrangement of divisions and subdivisions founded upon some distinguishing characteristics sufficiently marked to assist retention. Such divisions and subdivisions have accordingly at all times been used by naturalists, founded on characters of greater or less precision in proportion to the progress of science. Aristotle adopted a sys-

tem of arrangement exceedingly simple, resting on divisions principally derived from the characters of external structure, food, habits, and locality. In truth, the science was not at that time sufficiently advanced for any other more abstruse arrangement. Neither human nor comparative anatomy were sufficiently cultivated to lend their aid to the formation of a better system; for comparative anatomy must always go hand in hand with Zoology, and the progress of one science always must bear an exact proportion to that of the other. Aristotle was, however, well aware of the advantages of a more scientific distribution of the animal world, and has strongly recommended to succeeding writers an attentive examination of the internal structure of animals as forming a proper basis of division: accordingly, most of the modern systems have rested on this foundation.

Our countryman Ray built his system on this recommendation of Aristotle. He attended closely to the different structures, and remarked that most essential and grand difference, that some animals possessed lungs and a sanguineous system, while others were destitute of both. He is undoubtedly the first writer on zoological subjects who has any pretensions to

a real scientific arrangement, and who may be said to have laid the foundation of all subsequent improvement.

The Linnæan system is, for the most part, founded on the general arrangement of Ray, just alluded to. In the quadrupeds more especially, Linnæus has followed Ray; but, unquestionably, his whole system is much more extended and improved.

Linnæus has divided the animal kingdom into six classes, founded mainly on the differences in the respiratory and sanguineous systems:—

Class I.—*Mammalia.* All suckle their young; the heart has two ventricles and two auricles; blood red and warm; viviparous.

Class II.—*Aves* (Birds). Characters as in the former class, except oviparous.

Class III.—*Amphibia* (Amphibious Animals). Heart one ventricle and one auricle; blood red and cold; respiration voluntary.

Class IV.—*Pisces* (Fishes). Heart and blood same as in Amphibia; respiration by gills.

Class V.—*Insecta* (Insects). Heart one ventricle, no auricle; *sanies* cold, colourless; antennæ or feelers.

Class VI.—*Vermes* (Worms). Characters

same as in Class V., except no antennæ; but tentacula.

He then gives the natural characters at large of each class, taking in with the above internal structure all differences arising from the organs of respiration; from the jaws or mandibles; from the organs of generation and sensation; from the teguments; and the *fulcra*, as legs, wings, *&c.*

At the head of each class is given a short description of the *classical* character, so framed as to include an explanation of all the terms appertaining to that class.

Our author then subdivides the Mammalia into seven orders. The distinctions of these in this artificial arrangement are taken from the difference in the number, form, and situation of the three kinds of teeth: namely, the incisors, the canines, and the molars. But he does not neglect the feet, making a systematic division of the orders into digitated and hoofed animals, and such as are destitute of hoofs and claws.

We shall give the characters as they stand at the head of each order, and then enumerate the genera.

ORDER I.—*Primates.* Four incisors in each jaw, and one canine: genera, Homo, Simia, Lemur, Vespertilio.

ORDER II.—*Bruta.* No incisors in either jaw; seven genera: Rhinoceros, Elephas, Trichechus, Bradypus, Myrmecophaga, Manis, Dasypus.

ORDER III.—*Feræ.* Six conical incisors in each jaw for the most part; ten genera: Phoca, Canis, Felis, Viverra, Mustela, Ursus, Didelphis, Talpa, Sorex, Erinaceus.

ORDER IV.—*Glires.* Two incisors in each jaw; no canines; ten genera: Hystrix, Lepus, Castor, Mus, Sciurus, Myoxus, Cavia, Arctomys, Dipus, Hyrax.

ORDER V.—*Pecora.* No fore-teeth in the upper jaw, six or eight in the under; eight genera: Camelus, Moschus, Giraffa, Cervus, Antilope, Capra, Ovis, Bos.

ORDER VI.—*Belluæ.* Obtuse fore-teeth in each jaw; four genera: Equus, Hippopotamus, Sus, Tapir.

ORDER VII.—*Cete.* No uniform character of teeth; aquatic pectoral fins; spiracula; four genera: Monodon, Balæna, Physeter, Delphinus.

The generic characters of the Mammalia, like those of the orders, are mostly taken from

the teeth, except in the Vespertilio which has this further mark, that there is a membrane attached to the feet and sides, enabling it to fly; in the Hystrix, which is covered with quills, and the whole order of Pecora, the genera of which are further distinguished by the absence, presence, or conformation of horns.

The specific distinctions in this class are drawn chiefly from the tail of the animal, but in few instances exclusively so, as the feet, ears, breasts, *&c.*, enter into the description. As in the genera, so in the species of the Pecora, the diversity of the horns seems to constitute various discriminations. In the Cete the nostrils and jaws are chosen as marks of distinction, these parts in their variations altering very materially the character of the head. The nasal canal or fistula of the cetaceous tribe is differently situated, being not always in the snout or rostrum, but sometimes in the forehead and sometimes in the neck; and while some species have a simple, others have a double orifice. Colour is but little regarded by Linnæus, except in the genus Simia, and in some genera of the Feræ, as Viverra, Mustela, *&c.*, in which, being both permanent and striking, he has thought fit to include it in the specific differences

The second class, *Aves*, is divided into six orders, the distinctions of which are taken chiefly from the beak; but in some Linnæus found it necessary to call in the tongue, nostrils, and in some cases the feet and other parts.

Order I.—*Accipitres*. Hooked bill, the superior mandible near the base being extended on each side beyond the inferior; in some it is armed with indentations resembling teeth; four genera: Vultur, Falco, Strix, Lanius.

Order II.—*Picæ*. Beak somewhat compressed and convex; twenty-three genera: Trochilus, Certhia, Upupa, Glaucopis, Buphaga, Sitta, Oriolus, Coracias, Gracula, Corvus, Paradisea, Rhamphastos, Trogon, Psittacus, Crotophaga, Picus, Yunx, Cuculus, Bucco, Buceros, Alcedo, Merops, Todos.

Order III.—*Anseres*. Smooth beak, broadest at point, covered with a smooth skin, and denticulated; tongue fleshy; toes palmate; thirteen genera: Anas, Mergus, Phaeton, Plotus, Rhyncops, Diomedea, Aptenodyta, Alca, Procellaria, Pelicanus, Larus, Sterna, Colymbus.

Order IV.—*Grallæ*. Beak somewhat cylindrical; tail short; thighs marked; four-toed; twenty-two genera: Phænicopterus, Platalea Palamedea, Mycteria, Tantalus, Ardea, Corrira,

Recurvirostra, Scolopax, Tringa, Fulica, Parra, Rallus, Vaginalis, Psophia, Cancroma, Scopus, Glareola, Hematopus, Charadrius, Otis, Struthio.

Order V.—*Gallinæ*. Beak convex; upper mandible vaulted over the inferior; nostrils half covered with a convex cartilaginous membrane; feet divided, but connected at the inmost joint; eight genera: Didus, Pavo, Meleagris, Penelope, Crax, Phasianus, Numida, Tetrao.

Order VI.—*Passeres*. Thick beaks, conical, sharp; nostrils, oval, wide, and naked; seventeen genera: Loxia, Colius, Fringilla, Phytotoma, Emberiza, Caprimulgus, Hirundo, Pipra, Turdus, Ampelis, Tanagra, Muscicapa, Parus, Motacilla, Alauda, Sturnus, Columba.

The generic characters are taken from peculiarities in the bill, the nostrils, the tongue, the feet, the feathers, the face, figure of the body, *&c.*

The specific characters in this class are drawn from a great many particulars. In several (as in Falco) the colour of the *cera*, or naked tunic that surrounds the basis of the beak, and the colour of the legs, are taken as distinguishing species. As, however, the colour of birds is liable to considerable variation from climate or season, Linnæus does not trust to this alone,

where a more permanent character can be found. The form of the tail, whether even, cuneated, or forked, is used by him as a distinguishing character. In the parrot-genus he uses it according to its greater or less length than that of the body. In others the colour of the beak, a naked or a crested head, serves as distinctive marks. On others nature has stamped some peculiarity by which they are immediately known; such as the receptacle of the lower mandible in the Pelican, two long tail-feathers in the Tropic-bird, *&c.* One very frequent mark is the difference of colour in the quill-feathers and those of the tail.

We now proceed in our account of the Linnæan system to the third class, called *Amphibia*; but we shall, for the sake of brevity, dispense, with any further enumeration of genera. Of this class there are two orders.

Order I.—*Reptilia.* Furnished with feet, and breathing through the mouth.

Order II.—*Serpentes.* Destitute of feet, and breathing by the mouth.

The generic characters of this class are taken from the general figure of the body, from the

absence or presence of tail, from a shelly covering, from the absence or presence of teeth, from being furnished with lungs; number, situation, and figure of the *scuta* or scales; number and situation of spiracula, *&c. &c.*

In the order of Reptiles the specific characters of the *Testudo* genus are deduced principally from the difference in the shells and feet; in the *Lacerta* from the head, tail, toes, and various other parts; in the *Rana* from the diversity in the make of the body, and from the number of claws and the hind and fore-feet. The specific characters of the Serpentes were more difficult to ascertain. Linnæus used the number of the small shields and scales, or the rings and rugæ of the belly and tail, and the proportion these bear to each other in the different species. But this character is liable to great uncertainty. The pattern or general distribution of markings in each species is more constant, and has been more dwelt upon by the followers of Linnæus.

Linnæus originally included two more orders in this class, the *Meantes*, solely made for the genus Siren, and that of *Nantes*, which are fishes, and breathe by gills. His successors have excluded them.

The fourth Class, *Pisces*, is subdivided into

six orders, the characters of which are taken from the situation of the belly fins.

ORDER I.—*Apodes;* have no ventral fins. This order embraces the Eel-kind, Torpedo, *&c.*

ORDER II.—*Jugulares.* Ventral fins placed before the pectoral; Cod, Blenny, *&c.*

ORDER III.—*Thoracici.* Ventral fins under the pectoral; Sucking-fish, Goby, Doree, Plaise, *&c.*

ORDER IV.—*Abdominales.* Ventral fins placed behind the pectoral; Skeat, Salmon, Pike, *&c.*

ORDER V.—*Branchiostegi.* Gills destitute of long rays; Sun-fish, Pipe-fish, *&c.*

ORDER VI.—*Chondropterygii.* Cartilaginous gills; Lamprey, Ray, Shark, *&c.*

The two last composed the order *Nantes* in the class *Amphibia* in the first editions of Linnæus, but have been returned to their proper place by his successors.

The generic characters of this class are taken from peculiarities in the head, mouth, teeth, nostrils, rays in the membrane of the gills, eyes, general figure of the body, tail, situation of spiracula, *&c.*

The specific characters are also taken from peculiarities in the above-mentioned parts, but are much too various to enumerate. In the last

edition of the *Systema*, the number of pinnal rays is most insisted on.

The fifth class of Insects is subdivided into seven orders, the characters of which are mostly taken from the differences observed in the number and texture of the wings.

Order I.—*Coleoptera.* Wings four, the upper two crustaceous, divided by a straight suture.

Order II.—*Hemiptera.* Wings four, upper two semi-crustaceous, incumbent on each other at the inner edges.

Order III.—*Lepidoptera.* Wings four, all of them having imbricated scales.

Order IV.—*Neuroptera.* Four wings, all of them membranaceous; no sting.

Order V.—*Hymenoptera.* Four wings, membranaceous; stings, but only in the females and neuters.

The generic and specific characters are drawn from different parts of the body, and from so prodigious a variety of circumstances, that we cannot think of entering even on the slightest detail of them.

The sixth class, *Vermes*, is divided into five orders.

ORDER I.—*Intestina.* Animals, simple, destitute of limbs, naked.

ORDER II. — *Mollusca.* Animals, simple, naked, not included in a shell furnished with limbs.

ORDER III.—*Testacea.* Animals with the same characters of the last, but included in a shell.

ORDER IV.—*Zoophyta.* Composite animals, resembling a flower, and springing from a vegetation and stem.

ORDER V.—*Infusoria.* Very small simple animals.

We have only to add a word or two respecting Linnæus's method of treating the species: throughout his system, the *classical, ordinal,* and *generic* characters always make, or are understood to make, a part in the description of each species. After these, Linnæus begins with his own specific name for the animal, established upon the most essential difference observable between that and every other species of the genus. If the specific name be the same adopted in any of his former writings, he refers to it. He has, however, in many parts of his enlarged edition of the *Systema,* formed new names to animals noticed

in the preceding edition, and in the *Fauna Suecica.*

After his own *specific* name, he gives the synonymes of the most reputed and authentic writers, with reference to the pages of their works, and to the best figures of his subject; then the *locus natalis*, and, in many instances, a short but comprehensive history of the nature, economy, and uses of the animal. To every species the author has affixed his *trivial* name, expressive, most commonly, of the place where the animal is found, of its colour, form, or other quality; or in many instances, when the subject has been well known by an arbitrary term, he retains that as his trivial name.

This arrangement of Linnæus appeared to possess one very great advantage, and that is, that in a few lines, he gives a distinction immediately pointing out the animal in question, and one that is easily retained in the memory. But this advantage, great as it may appear, has given birth to some incongruities, which more than counterbalanced its good effect. It has been objected, that, by confining himself too closely to one kind of character, Linnæus has thrown together, in different parts of his system, subjects widely remote in their

general appearance and economy. Thus, for instance, in the Mammalia, the character of the orders is taken from the structure, number, and position of the teeth. Now it happens, that a few animals bear, in this respect, a resemblance to mankind. They have four front or cutting-teeth in each jaw, with a small canine on each side of the other four. From this circumstance, Linnæus has associated them all in one common order, to which he has given the name of *primates* from its embracing man, with whom the Bat is ludicrously associated under this dignified title. Man possesses characters peculiar to himself, which should separate him from every other living being on the globe. Even to his physical structure, the Bat, one of the lowest of the mammifera, makes but a trivial approximation, and his mental endowments place him at an illimitable distance from all the rest of the animated creation.

We have thus given a general outline of the Linnæan system, that our readers, who have not studied it, may have an opportunity of comparing it with that of the Baron. To do the same by the latter, would be superfluous, and anything further that we have to say on the subject, must be confined to a few general observations.

Linnæus, it must be confessed, carried the art of distribution and the management of characters to such a degree of clearness and brevity, that any person familiarized to his language, may easily find in his immense catalogue, the name and place of any being that he would observe. The extraordinary influence that this celebrated man acquired, is owing to this facility which results from his arrangement, to the convenience of his nomenclature, and especially to the care with which he inserted in his catalogue all the known animals of his time. This influence though somewhat despotic, had the advantage of uniting all naturalists under the laws of one common and intelligible language. An advantage, the absence of which the student of Natural History at present too often feels occasion to deplore, when, in consulting the works of different writers, he is puzzled by the diversity of terms, and overwhelmed by their number. Every new work he takes up, he finds the necessity of learning a new language; too happy, if the final result of his inquiries be not an accumulation of names, instead of ideas, a knowledge of epithets, rather than of the qualities and relations of actual existence.

From the death of Linnæus, to the period of our illustrious author, it must be confessed that a sort of anarchy prevailed in the systematic part of Natural History, and divisions of all degrees, and the names attached to them, varied to such an excess, as to fatigue the most tenacious memory, and render the study excessively disgusting to the amateur.

This disorder, however, arose from a natural tendency in philosophic minds, towards a better order, to which the plan of Linnæus seemed calculated to prevent naturalists from ever arriving. The desideratum was to arrange the facts, of which the science treats, in a series of propositions, so graduated and so successively subordinate, that the whole might represent the actual relations of living beings.

For this purpose it was necessary, as our author remarks, to group animals according to the *entirety* of their properties or organization, so that those contained in such a group, shall bear a stronger mutual resemblance to each other, than to any individual of a different group. This arrangement is what is now termed the *natural method;* but as it evidently required a perfect knowledge, in detail, of all the parts of individual beings, naturalists

were long obliged to adhere to those systems of pure nomenclature, established like the Linnæan on some isolated organ, often chosen in an arbitrary manner.

Zoology offers greater facility for the formation of a natural method than botany. The resemblances between animals are more striking, and their causes more easy to ascertain. The distinctive characters of the leading divisions, were ascertained even by Aristotle, as we have seen, with sufficient justice and precision; and as these divisions were introduced into almost every subsequent zoological system, they rendered the other incongruities of detail less striking. Thus, the necessity of a natural method being less felt, the search after such a method was neglected. From this, it happened that the classes of vertebrated animals, though distinguished naturally enough, were yet subdivided in a fantastic manner, and still greater confusion prevailed among the invertebrated tribes.

The first leading distinction between our author and Linnæus, is in the grand division of the animal world. These the Baron makes to rest on the nervous and sensorial, not on the circulatory and respiratory systems. From a profound study of the physiology of the na-

tural classes of vertebrated animals, he discovered in the respective quantity of respiration, the reason of the quantity or degree of motion, and, consequently, the peculiar nature of that motion. This last, gives rise to the peculiar form of their skeletons and muscles; and with it, the energy of their sensations, and the force of their digestion, are in a necessary relation. Thus zoological arrangement, which had hitherto rested on observation alone, assumed, in the hands of our illustrious author, for the first time a truly scientific form. Calling in the aid of comparative anatomy, it involves propositions applicable to new cases; it becomes a means of discovery, as well as a register of facts, and by correct reasoning, founded on copious induction, it partakes of the demonstration of mathematics, and the certainty of experimental knowledge; in short, it becomes what it never was before, a science.

Our author having examined the modifications which take place in the organs of circulation, respiration, and sensation, in the invertebrated tribes, and having calculated their necessary result, has formed a new division, in which these animals are arranged according to their actual relations. The mollusca,

more especially, which Linnæus and his successors confounded with the zoophytes, and other more simple animals, under the common name of *vermes*, our author has assigned to their proper place, at the head of the invertebrated tribes. They are distinguished from the rest, by an organization much more complete, by the existence of a heart or a brain more or less complicated. In one entire class (the *annelides*,) M. Cuvier has discovered red blood and a circulating system, which class had been confounded by Linnæus, with worms in general, and particularly with the intestina. This justifies the title of *invertebrated animals* given first by M. Lamarck, to this immense portion of the animal kingdom, instead of *white-blooded animals*, the name by which they were formerly distinguished. The zoophytes have been also established by our author within their proper limits, as have also been the crustacea, which had been confounded in the immense family of insects. But we shall say nothing more respecting the merit of our author, than that his *Règne Animal* is the completest and most scientific zoological arrangement that the world has ever seen; that it is the very grammar of the science, and must be profoundly studied by every person who proposes

to become a zoologist. We do not mean to assert that the arrangement of the Baron is faultless; we do not mean to say that it might not be improved. All we mean to say is, that there is none better, and that no improved arrangement can be made, that shall not be founded on his system, and preserve his leading divisions.

The systems of M. Blumenbach, and M. Illiger, differ from that of Cuvier only in the subdivisions. It will be sufficient for our purpose to glance at their arrangements of the *Mammalia.*

The two first orders of M. Blumenbach, are the same with those of the Baron. His third order, *Bradypoda,* embraces four genera, found in the Edentata of the *Animal Kingdom,* viz., Bradypus, Myrmecophaga, Manis, and Dasypus. In the order *Cheiroptera,* he has only the genus Vespertilio. The fourth order, *Glires,* contains nine genera: Sciurus, Glis, Mus, Marinota, Cavia, Lepus, Jaculus, Castor, Hystrix. The sixth *Feræ,* twelve genera: Erinaceus, Sorex, Talpa, Meles, Ursus, Didelphis, Viverra, Mustela, Canis, Felis, Lutra, Phoca. The seventh, *Solidungula,* one genus: Equus. Eighth, *Pecora,* seven genera: Camelus, Capra, Antilope, Bos, Giraffa,

Cervus, Moschus. Ninth, *Belluæ*, six genera: Sus, Tapir, Elephas, Rhinoceros, Hippopotamus, Trichecus. The tenth and last, *Cetacea*, four genera: Monodon, Balæna, Physeter, Delphinus. Such is M. Blumenbach's arrangement of the Mammalia.

It may not be out of place to notice here that our author, in his original distribution of animals in his *Tableau Elementaire*, varied a little from the arrangement of the *Regne Animal*—He distributed the class Mammalia into three grand divisions:—

I.—Those which have claws or nails, including the following orders:—Bimana, Quadrumana, Cheiroptera, Plantigrada, Carnivora, Pedimana, Rodentia, Edentata, Tardigrada.

II.—Those which have hoofs. Pachydermata, Ruminantia, and Solipeda.

III.—Those which have extremities adapted for swimming. Amphibia and Cetacea.

M. Illiger commences his synopsis of the Mammalia, by definitions of the zoographical terms, which will be found extremely useful to the student. He divides the Mammalia into orders, families, genera, species. The orders are fourteen.

ORDER I.—*Erecta.* Fam. 1. Erecta. Genus I. Homo.

ORDER II.—*Pollicata.* Fam. 1. Quadrumana (Apes and Monkeys). Fam. 2. Prosimii (Lemur, *&c.*) Fam. 3. Macrotarsi (Tarsier and Galago). Fam. 4. Leptodactyla (Chiromys). Fam .5. Marsupialia, containing all the pouched animals except the Potoroo and Kangaroo.

ORDER III.—*Salientia.* Fam. 1. Hypsiprymnus (Potoroo). Fam. 2. Halmaturus (Kangaroo).

ORDER IV.—*Prensiculantia.* Fam. 1. Macropoda (Jerboa). Fam. 2. Agilia (Dormouse, Squirrel tribe, *&c.*). Fam. 3. Murina (Marmot, Hamster, Rat, *&c.*). Fam. 4. Cunicularia (Mole-rat, Campagnol, Ondatra). Fam. 5. Palmipeda (Hydromys, Castor). Fam. 6. Aculeata (Porcupine, *&c.*). Fam. 7. Duplicidentata (Lepus, Lagomys). Fam. 8. Subungulata (Paca, Agouti, Cavy, Capybara).

ORDER V.—*Multungula.* Fam. 1. Lamnunguia (Tailless, Marmot, Hyrax). Fam. 2. Proboscidea (Elephant). Fam. 3. Nasicornea (Rhinoceros). Fam. 4. Obesa (Hippopotamus). Fam. 5. Nasuta (Tapir). Fam. 6. Setigera (Sus).

ORDER VI.—*Solidungula.* Fam. 1. Solidungula (Horse and Ass).

ORDER VII. — *Bisulca.* Fam. 1. Tylopoda (Camel, Llama). Fam. 2. Devexa (Giraffe). Fam. 3. Capreoli (Dur Musk, *&c.*). Fam. 4. Cavicornia (Antelope, Goat, Sheep, Ox).

ORDER VIII.— *Tardigrada.* Fam. 1. Tardigrada (Sloth, Ursine Sloth?)

ORDER IX. — *Effodientia.* Fam. 1. Cingulata (Armadillo, Dasypus Tricinctus, *&c*). Fam. 2. Vermilinguia (Orycteropus, Myrmecophaga, Manis).

ORDER X. — *Reptantia.* Fam. 1. Reptantia (Echidna, Ornithorhyncus).

ORDER XI.—*Volitantia.* Fam. 1. Dermoptera (Galeopithecus). Fam. 2. Chiroptera (Bats).

ORDER XII.—*Falculata.* Fam. 1. Subterranea (Hedge-hog, Tenrec, Shrew, Desman, Condylure, Chrysoclore, Scalops, Mole). Fam. 2. Plantigrada (Kinkajou, Viverra, Nasua, Racoon, Glutton, Badger, Bear). Fam. 3. Sanguinaria (Fennec, Canis, Hyæna, Felis, Civet, Zibeth, *&c.*). Fam. 4. Gracilia (Ichneumon, Mephitis, Mustela, Lutra).

ORDER XIII.—*Pinnipeda.* Fam. 1. Phoca, Trichecus).

ORDER XIV.—*Natantia.* Fam. 1. Sirenia (Manati, Dugong). Fam. 2. Cete (Balæna, Narwhal, Physeter, Delphinus, *&c.*).

This must suffice as a specimen of the method of M. Illiger. He gives the characters first, of the order, then of the family, if they have anything additional, and then of the genus.

It will easily be seen from this slight view, that M. Illiger's system is by no means distinguished for its simplicity. His passion for learned nomenclature, has carried him very far, and his mania for subdivision has only been exceeded by that of some later writers. He has new named numbers of genera, as well as orders and families. It may also be observed, that though some of his subdivisions are natural enough, others are not so; and many have that vice (which, indeed, in some cases, it is difficult to avoid), of embracing subjects in their definition, which are ranged under other subdivisions. M. Illiger, however, it must be considered, was but a young man when death put a period to his labours. He has left behind him much that is valuable, and there can be but little doubt, that had he lived, his assiduity and learning, would have rendered him one of the greatest ornaments of zoological science.

E. P.

INTRODUCTION.

AS many persons form erroneous or confused ideas of what is strictly intended by Natural History, it becomes the more necessary, by way of introduction to the present work, to define the object of that science; and in so doing to advert to the distinctions which separate it from other studies to which it is more or less analogous, and with which it is too often confounded.

The word nature in our language, as in most others, among its various significations, has these three: first, it means the qualities derived from original constitution, in contradistinction to those produced by art; secondly, it is used to signify the universe at large; and thirdly, the laws regulating those beings which collectively compose that universe. It is more especially in this latter sense that we are accustomed to personify nature, and to use its name for that of its Creator. Physics, or natural philosophy, includes the consideration of universal being under these three relations, and is either general or particular.

General Physics comprehends, abstractedly, the examination of the properties of those moveable and extended works of creation which we denominate bodies; that department of it called dynamics includes the consideration of solid bodies, for the purpose of determining mathematically, from a few experiments, the laws which regulate their equilibrium and motion.

This branch in its different divisions takes the names of Statics, Hydrostatics, Aërostatics, *&c.*, according to the nature of the bodies, the movements of which are examined.

Optics is confined to the consideration of the particular motions of light, and is a branch of natural philosophy in which experimental knowledge is becoming daily more necessary to the explication of its numerous phenomena.

Chemistry, another division of general physics, is the science by which we estimate and account for the changes produced in bodies by the motions of such of their component parts as are too minute to affect the senses individually. The practical part of chemistry may be said to consist in placing bodies in such positions relatively to each other, as are thereby adapted to produce certain changes. It is, therefore, obvious that this science is the result of experiment, and is not reducible to mathematical calculation, or methodical deduction.

The theory of heat and that of electricity, according to the point of view in which each is considered, appertain almost equally to dynamics and to chemistry.

The method by which the various branches of general physics are cultivated, consists in reducing the several bodies which are respectively the subjects of each particular branch to their greatest attainable simplicity; in examining their various properties when called separately into action, by the exercise either of reflection or experiment, and observing or calculating the results; also, by generalizing and connecting the laws by which they are regulated, so as to form, as it were, certain codes; and finally, if possible, to establish some universal principle into which all such laws so ascertained and methodized, may be finally resolvable.

By *Particular Physics*, or *Natural History*, (for the terms are synonymous,) is intended the particular application of the laws ascertained by general physics to the various subjects of creation, for the purpose of explaining their different phenomena.

In this extensive signification, natural history would include astronomy, which is acquired by the aid of mechanics alone, to the laws of which it is completely subservient. The mode of studying it is too different, therefore, to permit its classification under the head of natural history. We must also exclude meteorology for reasons somewhat similar.

After these exceptions, natural history, restrained from the consideration of the objects of pure calculation and precise experiment, will be found to claim as its proper province the inanimate bodies called minerals, and the various kinds of living beings, both

vegetable and animal, in all of which phenomena may be observed varying more or less from the known laws of motion and of chemical attraction, as well as from every other cause, the analysis of which is appropriated to general physics.

Hence it appears that mineralogy, botany, and zoology form the principal divisions of natural history, as ordinarily understood.

Natural history should, in strictness, be cultivated by the same methods as are adopted in the various branches of general science, and in fact it is so cultivated, when the objects of it are sufficiently simple to permit the usage of such methods. But this is very far from being practicable in every instance. There is this essential difference between the general sciences and natural history: in the former the student possesses a power of regulating the conditions of the phenomena which he studies; in the latter, the phenomena are by no means subject to his control. He cannot, like the experimental philosopher, separate the elementary parts from each other in the objects of his examination. Such objects come under his view in a complex form, and he can decompose them and analyze their component parts only in thought. What a variety of conditions, for example, are necessary to animal life! If, in attempting to analyze the nature of that life, we were in reality to separate from it any of those requisite conditions, its duration must instantly cease, and the object of our researches be frustrated. We must, to use the language of the poet, "lose it in the

moment we detect." Hence we see that dynamics is a science principally of calculation, chemistry of experiment, and natural history of observation.

These terms are sufficiently characteristic of the methods employed in cultivating the three branches of natural science, and also serve to point out the different degrees of certainty attainable in each. Calculation, as it were, commands nature, and determines her phenomena more accurately than observation can make them known. Experiment forces her to unveil, and observation watches her when refractory, and is always on the alert to surprise and detect her.

There is also a principle peculiar to natural history, which is employed with considerable advantage in a variety of instances, in the prosecution of that study. It is that of the *conditions of existence*, commonly termed *final causes*. As no material body can exist, unless it combine all the conditions which render such existence possible, its component parts must be so arranged as to admit of this possibility, not only in itself but in relation also to whatever surrounds it. The analyses of these conditions, or final causes, frequently lead to the discovery of general laws, demonstrated as clearly as are those derived from calculation or experiment: and it is not until all the laws of general physics, and those also which are brought to light by these conditions of existence are exhausted, that the natural historian is reduced to simple observation.

Mere observation will, however, avail but little

without comparison, we must observe attentively the same body in the various positions in which it is at different times placed by nature; and we must compare different bodies with each other, until we can recognise any invariable relations which may exist between their structure and the phenomena which they exhibit. Thus may such bodies, when diligently observed and carefully compared with each other, be considered as experiments ready prepared by the hand of nature, who may be supposed to add to or subtract from each in the manner the experimentalist does in his laboratory with the inert materials subject to his control, and herself to present us with the result of such additions or subtractions.

By these means we may arrive at a knowledge of the laws which regulate the phenomena of natural history, strictly speaking, subject to our observation, and which are employed by the great Governor of the universe with the same determinate precision as those which are opened to our view by the general sciences.

When we have once united the laws of observation with the general laws of matter, and with the conditions of existence, a system of natural science will be complete, and we shall then perceive and feel the mutual influence that prevails throughout the works of nature. This is the grand desideratum, to obtain which the efforts of naturalists should be steadily directed.

But all researches by observation and comparison

seem to pre-suppose that we possess the means of distinguishing accurately the objects of such observation and comparison, and of making the distinctions we establish clear to others. Without this all must be a chaos of confusion, a "rudis indigestaque moles." The first object, therefore, of natural history, the basis of all investigation, must be the formation of some certain system of arrangement, some methodical classification of the countless objects of natural history with which creation presents us.

Such is what is usually termed a system of nature; or, a grand catalogue of nature's works, in which all things may have suitable names, may be recognised by distinctive characters, and be methodically distributed into divisions and subdivisions, from the appellations and characters of which the objects classified under each may be immediately sought for and discovered. That each being may be recognised in this catalogue, the characters by which it is distinguished should be permanent and essential to it; they should never be drawn from properties or habits, the exercise of which is capricious, occasional, or transitory. They must, in fact, be altogether founded upon the principles of its conformation.

But there are very few objects in nature which can be recognised by any one single simple character; the combination of many of these is requisite to distinguish any individual object from others which resemble it in some, though not in all, of

its characters or peculiarities. The more numerous the objects we have to distinguish, the greater must be the accumulation of such distinctive characters, so that accurately to distinguish any one object from every other beside it would be found necessary, without some more concise method, to enter into a complete description of it. To obviate this inconvenience, divisions and subdivisions have been invented. Thus a certain number of objects, similar to each other in general conformation, and differing only in minor particulars, are arranged together, and the gross is denominated a *genus*.

To avoid the same inconvenience in distinguishing the genera the operation is repeated, and the genera which are assimilated to each other are, in like manner, formed into an *order*, and these again which border on each other constitute a *class*. Intermediate subdivisions are also established when necessary. The application of these several divisions of classes, orders, and genera, to the animal world, will be considered hereafter. They are employed in the mineral and vegetable, as well as in the zoological division of natural history.

This scale of divisions, of which the superior contain the inferior, is what is called a system or method. It is, in some respects, a sort of dictionary, wherein, from the properties of things, we proceed to discover their names, thus forming the inverse of ordinary dictionaries, wherein the names direct us to the properties.

But, if any proposed system or method be good,

it does not limit itself to teaching us names only; if the subdivisions have not been capriciously established, but rest upon true fundamental distinctions, upon the essential resemblance of the objects subdivided, such a system will prove the surest means of generalizing the properties of such objects, of expressing them in the fewest, most comprehensive, and most significant terms, and of impressing them most successfully upon the memory.

To invent a system at once rational and serviceable to science, it is necessary to make an assiduous comparison of the works of nature, under the guidance of that principle which is termed the *subordination of characters*, a principle which is itself derived from that of the conditions of existence already alluded to. The separate parts of every being must also possess a mutual adaptation; there are, therefore, certain peculiarities of conformation which exclude others, and some again which necessitate the existence of others. When we know any given peculiarities to exist in a particular being, we may calculate what can and what cannot exist in conjunction with them. The most obvious, marked, and predominant of these; those which exercise the greatest influence over the totality of such a being are denominated its *important or leading characters*, others of minor consideration are termed *subordinate*.

The degree of influence of the peculiarities or characters of any given being, may be frequently determined by considering the nature of the organ

by which they are demonstrated, or, when this fails, simple observation will suffice for the purpose, as the important characters may be generally known by their constancy, and in a series of observations upon a succession of various individual objects of nature, arranged according to a greater or less degree of similitude to some common given type, these important characters will ever be found to be the last that vary. Hence they are properly selected to distinguish the grand divisions, while the subordinate characters are employed with equal benefit to mark the subdivisions. There can be but one rational mode of forming an artificial system, and that will be more perfect in proportion as it approximates more nearly to the system of nature; here is the point of perfection to which the former should be directed; for it is evident, that if it once attained to this, it would exhibit compendiously a perfect impression of its glorious prototype.

Life is the most important of all the peculiarities of created being, and of all the characters the most elevated. It is therefore not surprising, that in all ages it has formed the first and most general of the principles of distinction and arrangement, and that the works of nature have always been separated into two immense divisions, that of animated, and that of inanimate, beings.

Of Living Beings, and of Organization in general.

To form a just idea of the nature of life, whether vegetable or animal, we should first observe its effects in those bodies where such effects are the most manifest, obvious, and simple. The result of such investigation will convince us, that life consists in a faculty possessed by certain corporeal combinations, of continuing for a time under one determined form, by attracting incessantly from without, and identifying with the matter of their own composition, particles of extraneous substances, and by rendering to the surrounding elements portions of their own.

Life may further be considered as a vortex more or less rapid, more or less complicated, the action of which is constant, and is always on particles of the same description; and as all the individual component particles of a living body are thus in a state of perpetual mutation, constantly going and coming, we may be permitted to assert, that the form of such a body is more essentially and properly its own than the substance, the one is co-extensive with its existence, the other is gradually but incessantly changing.

While this movement continues, the body in which it is carried on is living; when the movement ceases—to return no more—the body dies, and the elements which compose it become immediately,

subject to their ordinary chemical affinities, they are no longer restrained from separating, and the dissolution of the late living body follows, with greater or less rapidity. It was by means of the vital motion that this dissolution was prevented before, and the material corporeal elements preserved for a time in a state of union. All living bodies die after a time, the extreme limit of which is fixed in every species. Death is a necessary effect of life, which, by its very action, seems gradually to alter the structure of the body, so as to render its continuation impossible; for a living body undergoes a gradual but constant change during the whole period of its existence; at first it increases in dimensions, according to certain proportions and limits fixed and determined for every species, and afterwards it augments in density in most of its individual parts. It is this latter change which appears to be the cause of natural death.

If we further enlarge our observations to the various sorts of living bodies, we shall find a principle of structure and being common to them all, which a little reflection will convince us to be essentially requisite to that faculty, analogous to a vortex, with which the vital action has been assimilated. We should observe, that solid parts are necessary to preserve the various forms of living bodies, as well as fluids, to sustain in them the necessary motion *.

* It may be observed that the opinions of Cuvier, respecting life and organization, entertained both at this place and in other parts

Accordingly, they are all composed of streams and plates, or of fibres and solid laminæ, which enclose the liquids in their interstices. It is in the liquids that the motion is the most rapid, unceasing,

of his writings, appear by no means precise or consistent, viewing them as *explanations* of the nature of these phenomena. But, after an attentive consideration of the scope of his observations, and of the views to which they lead, we cannot conclude that they are stated with any other intention than to serve as *illustrations* of functions, or operations, which, although they have a general place in organized bodies, must, nevertheless, proceed from some other cause still more general.

These illustrations, however, which Cuvier has adopted having been eagerly laid hold of by materialists as *explanations* of the manifestations of organized matter, and having been uniformly quoted by them as such in favour of their doctrine, he has been therefore ranked as one of its supporters. No one, we believe, will deny that functions of a kind with, or similar to, those which Cuvier has designated in the text, have a very general place in organized bodies; but it is evident, from the tenor of his remarks, and even from his affixing the epithet vital to them, that although he thus assigned them a very general operation, yet he did not consider them to be sufficient to explain the nature or origin of the manifestations which such bodies display, which topics indeed, he seems to us to have left entirely uninvestigated.

As the illustrations which Cuvier has adopted appear to many to favour opinions which, we believe, they were not intended to support, and as they may have that tendency when assumed as explanations of the *nature* and *origin* of the phenomena to which they relate, especially when detached from their contexts, and vaguely assigned as the basis of speculations on these topics, we shall offer a very few remarks respecting them; and we shall, therefore, view them in the acceptation which materialists assign them, in order to point out their insufficiency to explain the manifestations which the organized creation presents.

1st. Neither the illustrations which Cuvier has given in the text, nor any other modes of illustration, which do not admit the controlling influence of vitality, however varied and applicable they may seem to those who look merely at the gross relations of

and extended. Extraneous substances penetrate the body, and first become mixed or actually identified with the fluent liquid. This in its turn nourishes or renovates the solids, by deposition of certain of its component particles, and also detaches from the solids such of their parts as, having per-

things, can account for the nature or origin of the phenomena to which they relate; for, however me may substitute terms, or multiply illustrations, we cannot explain the changes which continually take place in living bodies, by means of the laws and affinities which characterize the combinations of inorganized matter. Such, therefore, being the case, we are justified in recurring to the belief in a vital principle which, allied to matter, controls its changes and forms, and to which principle the laws and affinities of inanimate matter are entirely subject. By means of such a superior influence we are enabled to explain the phenomena of the organized creation, but without its assistance we are lost in the mazes of vague hypothesis and groundless supposition.

2d. It has been objected to the existence of such a principle, that we cannot demonstrate it to the senses, in a form unconnected with matter. But we are not contending for the existence of a principle which is material, according to the received notions respecting matter, therefore it is no evidence of the non-existence of such a principle that it does not become visible to our senses, in an uncombined form; it is, however, sufficiently demonstrable in its effects, in alliance with matter, in which state it presents proofs of its being equal to those from which we infer the existence of matter itself.

3d. In order to explain the phenomena which are more justly ascribed to a vital principle, the favourers of organism,—amongst whom we can scarcely rank Cuvier, as we have already observed—have recourse to the substitution of terms, to occult qualities, to impulses, to motions, &c.; and when required to show wherein such qualities, impulses, and motions, are different from the qualities, impulses, and motions which are subjected to our experience, they endeavour to rid themselves of the difficulty by denominating them vital, as if such a denomination were not a tacit admission of the very principle, in the place of which such insufficient properties are at-

formed their office, are become redundant, and, re-assuming a liquid or gaseous form, traverse the pores of the body, and are exhaled. The solids also not only contain the liquids, but promote their movement, by dilatation and contraction.

But if this mutual action of the solids and liquids, this change of atoms from one state to another, really take place, it must follow that there is a close affinity in the chemical composition of each; and accordingly we find that such solids are in a great measure composed of elements easily convertible into liquids or gas *.

tempted to be substituted, and after all with not the smallest success in preventing a recurrence to this principle, of which all these properties, admitting their existence, are nothing more or less than the results; for however we may denominate them, we merely substitute expressions, which (if they convey any meaning,) imply only the existence of certain effects or operations, which proceeding from a first cause, are inferior agents, or instruments, under the control of vitality, in the production of organic phenomena.

* Yet no chemical combination or affinity, resulting from the various proportions and conditions of the elements of matter, or of their aggregate or more or less compound state with which we are acquainted, can explain the changes of the circulating fluid into organized solids, on the one hand, or the return of the animal solids into the particular states of fluidity which they occasionally assume in a living body, on the other. It is true that both the solids and fluids of an organized body, in which life is extinct, may be converted into other solids and fluids, by an abstraction, addition, or substitution of ingredients, or by such other change in the elements which usually enter into their composition, to which change these elements are naturally disposed, when that influence is withdrawn which until then controlled their combinations and forms of existence; but the products which thus result from the spontaneous changes and chemical combinations, which take place when the control of a superior principle is withheld, are altogether

The movement of the liquids requiring also a continued and repeated action on the part of the solids, it is necessary that the latter should be capable of flexibility and dilatability. This likewise is found to be a general character of such solids.

This structure common to all living bodies, this porous texture, by which fibres and solid plates more or less flexible intercept liquids more or less abundant, is what is called *organization;* none therefore but organized bodies are susceptible of life. Organization results, then, from a variety of arrangements, which are all of them necessary conditions of life, without which life cannot subsist. If the effect of the vital action be to change either of these conditions, so as to alter but one of those partial movements of which its own totality is composed, the cessation of life must necessarily ensue.

Every organized body, independently of the common qualities of its texture, has a form peculiar to itself, not only in its general and external structure, but even in the detail of its minutest part.

different in their properties, characters, and forms of being, from those solids and liquids which constitute the individual textures, and the component parts of an organized and living body.

If, therefore, no principle or law from amongst those which always regulate the changes of inanimate nature, can explain these changes to which the elements of organized bodies are subjected, and the various phenomena which such bodies present, we are justified in ascribing these changes and phenomena to a superior regulating principle or influence, which is manifested to our imperfect senses and experience only in alliance with material elements, and there chiefly in its effects upon these elements.

It is this form which determines the particular direction of every partial movement within it, and regulates the complex operation of the vital action at large *, and it is this form which constitutes the species, and makes it what it is. All the parts co-operate to produce the general movement, by a particular action proper to each, and each in its

* Although we may grant that the *organization* and *form* of a part determine, *in some measure*, the nature and extent of its functions, we may, with equal justice, add that they are merely the instruments or apparatus, whose operations are much more completely influenced by a principle to which this apparatus is subjected, and by which it is entirely actuated: which apparatus, moreover, is itself formed from the circulating fluid, by means of the influence this principle exerts upon the material elements with which it is allied. To the influence of such a principle the organized apparatus is subjected as long as it continues to perform its functions, and as soon as this influence is removed all its operations immediately cease. Thus we perceive that an organ, or part of one of the more perfect of the class of reptiles, may be removed and a similar organ or part be soon afterwards reproduced from the blood, by means of the vessels on the surface whence it was separated; and according as this organ becomes more perfectly regenerated, so it performs, in a more perfect manner, similar offices in the economy of the animal to those which its predecessor fulfilled. In this case two circumstances excite our attention, *viz.*, the reproduction of the part, and the perfect performance of its functions when reproduced: 1st, we have no means of explaining—for our acquaintance with the mutual action of the elements or aggregates of matter furnishes us not with the means of explanation derived from that source alone—the regeneration of the part, and the exact form which it assumes, unless we admit that the production of a part or organ is directed by means of a superior and controlling principle in alliance with material elements; and 2dly, the subsequent functions of the reproduced organ cannot be otherwise accounted for than by assuming that, as it is reproduced, so it becomes endowed with this principle which afterwards continues to actuate it as long as its operations continue.

turn experiences the effects produced by such general movement, so that in every being life produces as its result a mutual action and re-action of all its parts.

Life then, in general, presupposes organization in general *, and the life proper to any particular being presupposes the organization proper to such a being, as the movements of a clock presuppose the existence of the clock itself. Thus do we see life only

* That life pre-supposes organization is the foundation on which the doctrine of organism is erected. How much stronger is the evidence for the converse of this position—namely, that organization presupposes life? An attentive consideration of the phenomena presented by organized bodies, and a fair contrast instituted between these and the changes which inanimate matter exhibits, will readily convince the mind unbiassed by preconceived notions which of the two doctrines to prefer.

If we grant, for a moment, that the organization existed before its imputed effects, we are led to inquire how it came to exist. Is there any property or law, independent of life, with which our experience of the phenomena of the particles of matter has made us acquainted, that can explain the manner in which matter first became organized, and then assumed certain functions distinct from those displayed by matter in its original and unorganized states? Do we ever perceive such combinations of matter taking place, independently of life, from which first result organized forms, and afterwards vital operations as a consequence of such forms? To what property of matter can we impute such a wonderful assemblage of specific textures and organs which constitutes but a single species; and how come these textures and organs to unite in forms so varied, and yet so uniform, and to present characters appropriate to numerous classes, genera, and species, before some principle was in operation, to whose influence we may ascribe such phenomena, since the properties of inanimate matter cannot explain any of the changes essentially vital, and seeing that these properties, without exception, are, in organized bodies, completely subject to superior laws which have no relation with

in such beings as are fitted and organized to enjoy it, and all the efforts of natural philosophers have never been able to discover matter either organizing itself, or organized by any external cause. Life,

matter in its inorganized state? Can it be shown, even granting that bodies become formed in all their parts in a manner analogous to crystallization—from the proportions and properties of the constituent particles—in what manner such bodies may assume vital functions, if the influence of a superior principle, which shall actuate the already formed machine, be withheld?

As the supporters of the doctrine of organism suppose that organization is as much the result of certain proportions and properties of the particles of matter, as crystallization is the effect of those conditions of the constituents of the crystal, it may be asked, —Why are the different kingdoms, classes, genera, &c., of the organized creation preserved by means of generation between different sexes, since, if their functions proceed only from the properties with which their material particles are endowed, they may be expected to be perpetuated in the same way as the numerous forms and kinds of inanimate matter, whose phenomena are allowed by all to acknowledge no other source? Why do we not see living animals and plants spring up before us from the numerous combinations which the elements of matter composing such bodies are continually assuming, independently of ova, germs, or any species of generation from a living parent or parents? Why is the organized kingdom of nature alone perpetuated by this process, if its phenomena result merely from the combinations and properties of matter, when no other material combinations require analogous processes for their preservation? And finally, admitting that the material particles possess, in themselves, the properties which are productive of organization and of life, why do we not see the material particles which compose organized bodies, assume spontaneously—in virtue of such properties, and without a generative process and a regular succession of existence—organized forms and vital actions, when they are altogether present under circumstances favourable to the production of such phenomena? But the espouser of organism reply to the latter questions, that generation presupposes an organization for the specific purpose, and inorganized matter is, from the circumstance of its being inorganized, devoid of such a

exercising upon the elements which compose a living body, and upon the particles which it attracts, an action contrary to that which ordinary chemical affinities would produce without it, affords us a con-

faculty. This is at once an admission that the properties of matter alone cannot give rise to the formation of the generative organs, nor to their functions, and, consequently, that we must look to some specific principle which, from its influence, has been called a vital principle, as the necessary adjuvant of organization, and of the operations which organized bodies present. Indeed, experience sufficiently shows us that generation, in some of its forms, is peculiar to living bodies; that it is a process essentially vital; that it is a transfer or emanation of part of the life of the parent to the ovum; and that no similar phenomenon presents itself amid the changes to which inanimate matter is subject. Our endeavours to trace the origin of vital actions bring us naturally to this process, and from it we mount to the inference of an original parent, which at some remote period received its being from a first cause.

From our attempts to investigate the generative processes, we have every reason to infer, that the embryo or germ is endowed with vitality before its organs become fully formed, and that the organs can only be perfected by means of this influence. The ova of animals and the seeds of plants are evidently supplied with this principle, for they withstand, for a longer or shorter period, the external causes of change, and the operations of the affinities and laws which characterize inorganized matter. But, although we thus contend that the embryo (whatever may be its form or condition) is endowed with vitality, we cannot suppose that it possesses the various organs and textures essential to its future existence in a state of perfection; indeed, we have positive knowledge, that a perfect organization does not obtain at this early period of the existence of the offspring. All that we know is, that the embryo is produced from the parents in the simplest, but at the same time most imperfect, state of organization; that certain uniform phenomena, which it presents, shew it to possess an influence or principle which counteracts and controls the affinities of the elements with which it is allied, and that the earliest periods, at which its organization becomes a matter of demonstration, present

vincing proof that it cannot be itself the result of any such affinities, and we are nevertheless ignorant of any other created power in nature capable of uniting particles which before were separate *.

The birth of organized beings is the greatest mystery of organic economy, and indeed of all nature. We behold them developed, but we never see them formed. The most remote state to which we can trace them is when attached to a body resembling themselves, but developed before them, that is, to a parent. So long as the young has no independent existence, but merely participates in that of its parent, it is called a germ.

The place whereto the germ is attached, and the cause which detaches it, and gives it an independ-

us with its constituent textures, systems, and organs only partially or imperfectly formed. Hence we may infer, that organization is not the cause of life, otherwise we should perceive a more perfect condition of the organs, before the vital phenomena became so very manifest as they are at these periods.

* This paragraph is neither precise nor consistent. M. Cuvier commences it with ascribing life to organization, while he concludes it with asserting that the properties of matter and the chemical affinities cannot produce organization and life; yet at the same place he professes himself to be ignorant of any other created power in nature than the chemical affinities, which is capable of uniting particles which before were separate. If he had concluded, that we are ignorant of any other created power in *inorganized* nature than the one he has stated, capable of producing those results, or that the subject, in its remotest as well as profoundest relations, is placed beyond the reach of our senses and experience, while the resulting phenomena which come under our daily observation—the obvious effects of these unseen and unknown causes, are the fitting subjects for human intellection and speculation, he would have stated what none could controvert.

ent existence, are found to vary; but this primitive adhesion to a being similar to itself is a rule without exception. The separation of the germ is called generation.

All organized beings produce their like, otherwise death would be a necessary consequence of life, and the species must become extinct.

Organized beings have also the power of reproducing certain of their own parts, of which they may happen to be deprived. This power is possessed in various degrees by the different species, and is termed reproduction*.

The development of organized beings is more or less expeditious, more or less extensive, according as circumstances may be fortuitously more or less favourable. Hence it happens that the resemblance of descendants to their parents can never be perfect; differences of this description among organized beings are what are called *varieties*. We have no proof whatever that the differences which at present characterize the various living beings are likely to have been the result of circumstances. Every thing advanced upon this subject is purely hypothetical, and experience shews us that in the present state of the earth the varieties are confined to very narrow limits, and as far back as we are able to penetrate into antiquity, we find no reason to believe that they were ever more extensive†.

* See the Note at p. 17.

† The author is here speaking with a strict reference to *varieties* only.

We are therefore obliged to admit that certain forms have been perpetuated since the origin of things, without exceeding these limits. All the individuals belonging to any one of these forms constitute what is termed a species. The varieties, as we have seen, are accidental ramifications of the species.

As generation is the only method by which we can ascertain the degrees to which the varieties may extend, we may define the species to be an assemblage of individuals descended from common parents, who bear the same degree of resemblance to them as they do to each other. But, though this definition be rigorously correct, it is easy to perceive that its application to any given individuals must be attended with considerable difficulty, when we are deprived of the light of observation and experience.

By way of recapitulation, we may observe that absorption, assimilation, exhalation, development, and generation are the functions common to all living bodies; birth and death the universal limits of their existence; a porous contractile texture, containing within its laminæ moveable liquids or gas, the general essence of their structure; substances almost all convertible into liquids or gas, and combinations capable of mutual transformation into either of these, form the basis of their chemical composition. Fixed forms, perpetuated by generation, distinguish their species, determine their inferior functions, and apportion to each its destined part in the great theatre of the universe. These forms neither produce or

change themselves; life presupposes their being, for it can exist only in organized bodies prepared for its action; and neither the most profound meditation, nor the most sedulous observations, have ever been able to penetrate the mystery attached to the pre-existence of germs.

Division of organized beings into Animals and Vegetables.

Living or organized beings have, from the earliest periods of observation, been divided into two kingdoms, the animal and the vegetable; the first endowed with the faculties of sense and motion, the second destitute of both, and reduced to the mere capacity of vegetation. Though the roots of vegetables are constantly directed to where moisture is to be found, and the leaves toward the open air and light; though some plants seem instinctively to withdraw from the touch, and oscillations may be perceived in others, for which we can dicover no external cause, yet are these various motions too dissimilar to those of animals to afford any proof of perception and volition.

The spontaneous motion essential to animals requires peculiar modifications even in such of their organs as are purely vegetative. Unprovided with roots to penetrate the soil, and constantly absorb nutrition, other means were necessary of procuring aliment from without, and a peculiar reservoir for containing it within; hence is derived the first lead-

ing characters of animals in general, that is, their intestinal cavity, from which, passing through the pores and vessels, which may be considered a kind of internal roots, the nutritive fluid penetrates every part of their system, and sustains the whole.

The organization of this cavity and its appurtenances must, of necessity, vary and correspond with the nature and kind of aliment on which each species subsists, and the changes such animals must undergo to convert them into juices fit for the purpose of absorption. Plants, on the other hand, are supplied by the soil and the surrounding atmosphere with juices already prepared for absorption. The animal, whose functions are so much more numerous and varied than those of the plant, must consequently possess an organization so much the more complicated; and as from the nature of its constitution its parts could not preserve one fixed position relatively to each other, it is obvious that the motion of their fluids could not be produced by external causes, but must be, in a great measure, independent of atmospheric influence; here we trace the second leading distinction, or important character, of the animal world, namely, the circulating system, which is less essential than the digestive, and is unnecessary in animals of the simpler conformation. The animal functions requiring certain organic systems, not requisite in plants, the muscular system, for instance, for the purpose of voluntary motion, and the nervous for sensibility; and these systems, like all the rest, acting through the medium of the fluids,

it was necessary that the fluids should be more abundant, and the chemical composition of the animal body more complicated.

Accordingly azote, an additional substance, enters into the animal composition, as one of its essential elements, while in the plant it is found only accidentally united with the other general elements of organization, namely, oxygen, hydrogen, and carbon; this peculiarity forms the third of the animal characters.

Vegetables derive their nutriment from the sun, and from the circumfluent atmosphere in the form of water, which is a combination of oxygen and hydrogen; of air containing oxygen and azote; and of carbonic acid, composed of oxygen and carbon. The peculiar composition of plants requires that the hydrogen and carbon should be retained, the superfluous oxygen exhaled, and a very small quantity, if any, of the azote absorbed. Such accordingly is the process of the vital action in vegetables, where we perceive the most essential functions to be the exhalation of oxygen, which is performed by the assistance of the light.

The vegetable composition, of which hydrogen and carbon form the principal parts, is also a source of animal nutriment.

Animals, for the preservation of their own peculiar chemical constitution, must get rid of a great portion of the hydrogen and carbon, and absorb and retain more of the azote; this is done through the medium of the atmosphere, the oxygen of which,

combining with the hydrogen and carbon of the blood, is exhaled with them in the form of water and carbonic acid; as for the azote, into whatever part of the animal body it may penetrate, it always appears to remain there*.

The relations then of the animal and those of the plant with the surrounding atmosphere, are precisely in an inverse ratio to each other; water and carbonic acid are rejected by the one and produced by the other. The function of respiration is essential to the constitution of the animal body; it is that indeed, if we may be permitted to use such a phrase, in which its animality consists, and animals are found to exercise all their functions with more or less efficiency, in proportion as their respiration is more or less perfect. Respiration, the fourth of the

* The late experiments of Dr. Edwards, of Paris, seem to contradict this latter opinion. This enterprizing physiologist and chemist has inferred, from the circumstance of the opposite results given by his experiments, some indicating a diminution of the azote of the air, others an increase of it during respiration, that this gas is absorbed into the circulation, and afterwards is discharged from it; and that each of these actions is regulated by the constitution, habit, and circumstances of the individual, and by the influences to which he may be subjected, the absorption being to a small extent, when the exhalation is considerable, and *vice versâ*. Independently of the satisfactory nature of the experiments, whence Dr. Edwards has drawn his inferences, there are many collateral proofs that may be brought to their support, derived from the manifestations of the animal economy in health and in disease; and it appears extremely probable that not only is azote, but that other gases also are absorbed into and discharged from the circulation, in a greater or less quantity, according to the varying state of the vital energies of the animal system.

animal characters, is founded on the difference of relations above insisted on.

Of the forms peculiar to the organic elements of the Animal Body, and of the principal combinations of chemical elements.

A porous texture and three chemical elements * are essential to the composition of every living body; to that of the animal body a fourth † element is peculiarly requisite. This porous texture is composed, as it were, of meshes of a variety of forms, and these elements are united together in different combinations. There are three descriptions of organic materials or forms of texture, the cellular membrane, the muscular fibre, and the medullary substance, to each of which is attached a peculiar combination of the chemical elements, as well as an appropriate function.

The cellular membrane consists of an assemblage of fibres and laminæ of animal matter so mutually connected as to form a number of small cells, or cavities. It pervades every part of the animal structure, and may be considered as a kind of sponge similar in form to the entire body, possessing a property of contraction to an indefinite degree, when the causes which preserve it in a state of tension are removed. It is this power which retains the

* Oxygen, hydrogen, and carbon.
† Azote.

body in one consistent form, and within certain prescribed limits.

When condensed into a firm and compact structure it constitutes the various membranes of the body, which are more or less extensive. These drawn into a cylindrical shape from the various tubes called vessels, which, under more or fewer ramifications, are diffused over the whole corporeal system. The filaments termed fibres are also composed of the cellular substance, and the bones themselves are nothing but modifications of the same substance, indurated by the accumulation of terrene particles.

Cellular substance is ascribed by chemists to that peculiar modification of animal matter termed gelatine. It is entirely soluble in boiling water, and the solution assumes, when cold, the appearance of jelly.

Of the medullary matter, or, as it is sometimes termed, the cerebral substance, we have as yet been unable to discern the more minute organization. To the eye it presents the appearance of a soft and whitish matter, where nothing is distinguishable except a number of infinitely small globules. It is not itself susceptible of apparent motion, yet is it in it that the astonishing power resides of transmitting to the mind the impressions of the senses, and of communicating to the muscles the impulses of the will. The brain is, in a great measure, composed of this medullary substance, and the spinal marrow and nerves, which are distributed through all the sensitive parts of the frame, are, as far as their essence

is concerned, mere fasciculi, or bundles, of its ramifications. The muscular fibre is a peculiar species of filaments, of which, in the living subject, the distinctive property is contraction, arising either from the contact of some external body, or the action of the will communicated through the medium of the nerves.

The muscles are merely bundles of fleshy fibres. Every membrane and every vessel to which the operation of compression is essential, is provided with fibres of this description; and others are also always closely attached to the medullary filament, of the nerves. Those of the former description which minister to the merely vegetative functions of the animal system, contract without the consciousness of the mind, while the latter are the immediate organs of voluntary motion, when excited thereto by the nerves: though, therefore, volition is a chief exciting power, through the agency of the nerves, to set the muscular fibres in action, it is neither the general nor the sole power of this description.

The basis of the fleshy or muscular fibre is a peculiar substance, by chemists denominated fibrin. It appears naturally calculated to assume this filmy character, being soluble neither in boiling-water nor in alcohol.

The *nutrative fluid*, or the *blood*, as it is found in the circulating vessels, may be resolved for the most part into the general elements of the animal body, *i. e.*, into carbon, hydrogen, oxygen, and azote. Besides these it contains fibrin and gelatine, in a state

of readiness to contract and assume these membranous and filmy forms peculiar to themselves, provided sufficient rest be allowed for the manifestation of this tendency. We can also easily recognise in the blood a combination called albumen, commonly found in most of the animal solids and fluids, the property of which is to coagulate in boiling water. In the blood are likewise discovered most of the elements which can enter into the composition of the animal body; the phosphorus and lime which harden the bones of vertebrated animals; the iron from which the colour of the blood itself* and of various other parts is derived, and the fat, or animal oil, which is deposited in the cellular membrane, and serves to promote freedom and facility of motion in the various parts. In fact, all the fluids and solids

* The opinion that the colour of the blood is derived from the oxide of iron, which exists in the colouring matter of this fluid, was long adopted by physiologists and chemists. Dr. Wells first denied the conclusion in his "Observations and Experiments on the Colour of Blood," and the subsequent researches of Brande and Vauquelin seem to have fully confirmed his inferences. The opinion of Berzelius upon this subject, an opinion which must always receive the greatest respect from physiologists, is, that the colour of the blood cannot be imputed to the oxide of iron, since he has no reason to conclude that this metal exists in the red globules in the form of an oxide, and if it does, its quantity is insufficient for the production of the imputed effect. Nevertheless, he conceives that iron, in its metallic state, forms one of the constituents of these globules; these constituents are, in his opinion, iron, calcium, sulphur, phosphorus, carbon, hydrogen, oxygen, and azote; the products usually obtained by the incineration of this portion of the blood are, he considers, only new combinations of these elements, different from those in which they had previously existed in the red globules.

of the animal body are composed of chemical elements which the blood contains, each of such fluids and solids being distinguished by the various proportions it possesses of such elements; whence we discover that their formation depends upon certain subtractions from the elementary composition of the blood with perhaps, in a very few cases, the addition of some foreign element.

These operations, by which the nutritive fluid sustains or renovates the solid or liquid materials of the various parts of the body, might justly receive the general name of *secretions*; this appellation, however, is usually restricted to the production of liquids, while that of *nutrition* is more especially appropriated to the production and deposition of the materials, which are necessary for the sustenance of the solids.

The composition of every solid organ, and of every fluid, is suitable to the peculiar functions of each, and is preserved entire, as long as health continues, by the repairing operation of the blood. The blood itself, from the constant supplies which it thus furnishes, is undergoing a perpetual alteration, but is in its turn restored to its proper state by digestion, which renews its material, by respiration, which deprives it of the superfluous hydrogen and carbon, and by perspiration, &c., which relieve it from other superabundant particles.

These perpetual transformations of chemical composition, constitute a no less essential part of the vital action than the visible movements and alimen-

tary transmutations, for in truth the object of the one is but to produce the other.

Of the active forces of the Animal Body.

The muscular fibre is not merely the organ of voluntary motion. We have just observed, that it is moreover one of the most powerful agents adopted by nature for the operation of carrying on those motions and transmutations necessary to vegetative life. Thus the fibres of the intestines produce the peristaltic motion, whereby the chyle is driven into the orifices of the lacteal veins, and the fæces are protruded. The fibres of the heart and of the arteries are the agents of circulation, and thereby of every other secretion.

Volition, as has been also noticed, causes a fibre to contract, through the instrumentality of the corresponding nerve. The fibres not directly subservient to volition, such as those just instanced, are nevertheless affected also by the nerves which extend to them; hence arises a probability that the nerves also are the proximate causes of their involuntary contraction.

Every contraction in the animal frame, and indeed every change of dimension that we observe in matter in general, is operated through the instrumentality of chemical changes. Some fluid without momentum, such as caloric, appears by its flux and reflux to be the prime agent in these cases, as it assuredly is in the more violent convulsions and

movements discernible upon the face of nature. There is further every probability that this is so, inasmuch as it is clearly demonstrated that the impetus of the nerve on the fibre is not mechanical.

The medullary substance of the whole nervous system is homogeneous, and must, wherever it is found, be in a capacity to exercise the functions which appertain to its nature. An abundance of the blood-vessels are discernible in all its ramifications.

As all the other animal fluids are derived from the blood by secretion, there is every reason to presume that the nervous fluid is in the same situation, and that the medullary substance is the agent of its secretion.

On the other hand, it is most certain that the medullary substance is the only conductor for the nervous fluid. All the other organic elements act as repellants of this fluid, and serve to arrest its progress, as glass does that of electricity. The external causes which are capable of producing sensation, or of occasioning contractions of the fibres, are all chemical agents, possessing the capacity of decomposition; such as light, caloric, chemical salts, colours, percussion, compression, and the like.

There is, then, great reason to conjecture that these causes act upon the nervous fluid in a chemical way, by altering its state or composition; and this is the more likely, because the force of this action is diminished by continuance; and hence it appears necessary that the nervous fluid should be

permitted to re-assume its original state, for the purpose of undergoing a fresh alteration.

The external organs of sense may be compared to sieves, which permit nothing to pass through, and act on the corresponding nerve, but that which possesses a capacity of exciting that nerve, and that alone. Thus the tongue is provided with spongy papillæ, which imbibe saline solutions; the ear, with a gelatinous pulp, agitated by the vibrations of the atmosphere; the eye, with transparent lenses, permeable only by light.

The external irritating causes which occasion a contraction of the fibres, in all probability exercise this action by producing the same effect upon the fibre through the nerves, that volition does; namely, by altering the nervous fluid, so as to cause a change in the dimensions of that fibre upon which its influence is exerted. With this latter kind of operation the will has nothing to do, it is frequently carried on without even awakening the consciousness of the individual; and when actually separated from the body, the muscles are still susceptible of irritation, so long as the nerve remaining with them possesses its exciting power; a phenomenon most evidently unconnected with any thing like volition.

The nervous fluid undergoes alteration from [repeated] muscular irritation, as well as from sensibility and voluntary motion, and the same necessity then exists as in the latter cases, of re-invigorating the power of this fluid, by restoring it to its quies-

cent undisturbed condition, before its action can be [farther] continued or repeated *.

The alimentary transmutations necessary to vegetative life are operated through the medium of irritation; thus the food irritates the intestinal canal, the blood irritates the heart, *&c.* These movements are all independent of volition, and indeed of consciousness, at least during the continuance of health; the nerves which produce them are differently arranged in many parts from those which are appropriated to sensation, or subservient to the action of the will; and the precise object of this different arrangement appears to be to withdraw them from any such connexion.

The nervous functions, which are sensibility and muscular irritability †, are always performed with

* It must be recollected that the opinion of Cuvier respecting the existence of a nervous fluid is merely a physiological inference, in support of which we have no direct proof. Nor, indeed, have we any more satisfactory evidence to adduce in opposition to its existence, than that such a fluid is not demonstrable to the senses. Granting, however, this doctrine to be correct, it requires the introduction of the words included within brackets to make the explanation accord with the phenomena to which it refers. We think the opinion in question evidently shews that Cuvier has been insensibly betrayed, by the fashion prevailing in physiology at the time in which the above was written, to ascribe too much, and to resort too frequently, to chemical phenomena, in explaining the changes and operations which take place in, and which characterize, a living animal.

† With respect to the source of irritability, physiologists still continue to differ—some ascribing it to the nervous functions, others considering it a property of the muscular fibre, independent of the nervous influence. The Annotator agrees with

more activity and force, in proportion as their excitement, that is, the nervous fluid, is more abundant; and as this fluid is itself produced by a particular secretion, its abundance must depend upon that of the medullary substance which secretes it, and the accessions which this medullary substance receives from the blood.

In animals possessed of a circulating system, the blood travels to its destination through the arteries, which transport it along by means of their irritability and that of the heart. If these arteries are strongly irritated, they act with greater vigour, and propel a greater quantity of blood. The nervous fluid then becomes more abundant, augmenting the local sensibility, and increasing in its turn the arterial irritability *. This mutual action may be sometimes carried to an excessive pitch. Its ordinary appellation is orgasm, but when it becomes painful and permanent it is termed inflammation. The commencement of this irritating action may sometimes take place in the nerve itself, when it is subjected to the influence of lively sensations.

Cuvier, but at the same time restricts its cause to those nerves which are given off from ganglia—which accompany the blood-vessels and supply their coats, and which are removed from the influence of the will, owing to their being derived from different centres from that which gives rise to sensation and volition.

* "The nervous fluid becomes more abundant;" the arterial capillaries are consequently excited, and this excitation having extended to these capillaries which supply the ramifications of voluntary nerves, local sensibility is thereby augmented, and thus the arterial irritability is still farther increased.

This mutual influence of the nerves and the fibres, both in the intestinal and in the arterial systems, is the true mainspring of vegetative life in the animal creation.

As each external sense is permeable only by certain sensible substances, so each internal organ is accessible only to certain agents of irritation. Thus mercury irritates the salivary glands; cantharides, the bladder, *&c.* Such agents are usually termed specifics.

The nervous system being homogeneous, and continuously connected through all its parts, local sensations and irritations are found to produce general debility; and each particular function, when exercised overmuch, may weaken the rest: thus too much food enfeebles the thinking faculty; protracted meditation proves injurious to digestion, *&c.*; excessive local irritation has further the power of enfeebling the entire body, as if all the forces of life were embodied in a single point.

When irritation exists in one place, it may be counteracted and diminished by producing an opposite irritation in another; such is the mode in which purgatives and many other specific remedies are found to operate.

Rapid as the sketch which we have given on this subject necessarily is, it may suffice to establish the possibility of accounting for all the phenomena of physical life, by the admission of such a fluid as we have supposed the nervous fluid to be, from a con-

sideration of such properties and effects as are manifest to observation.

A summary consideration of the functions and organs of the Animal Body, and of the various degrees of their composition.

After what has been said in relation to the organic elements of the body, of its chemical principles, and of its active forces, it only remains to give a compendious idea of those functions in detail which are proper to an animal body, and of the organs appropriated to their use.

The functions of the animal body are divided into two classes :

1. Those peculiarly and exclusively animal, namely, sensibility and voluntary motion.

2. The mere vital or vegetative functions, which are common to animals and plants, *viz.*, nutrition and generation.

Sensibility resides in the nervous system.

The most extended of the external senses is that of feeling, which is seated in the skin, a membrane enveloping the entire body; this is traversed in every direction by nerves, which conduct the excitement of this sense to the sensorium, the final filaments of which are spread into papillæ upon the surface of the true skin, but guarded there and overspread by the epidermis, and in the different species by other insensible teguments, as hair, shells, *&c.*

Taste and smell may be considered merely as finer kinds of feeling, for which the surface of the tongue and of the nostrils is peculiarly organized; the former by means of papillæ somewhat inflated and spongy, the latter by its extreme delicacy, and the perpetual renewal on its surface of mucous secretion. We have already spoken of the eye and of the ear in general. The organ of generation appears endowed with a sort of sixth sense, residing in the interior skin.

The stomach also and the intestines manifest, by sensations peculiar to themselves, the state of these viscera. Accident or disease may produce in every part of the body sensations of greater or less acuteness.

Many animals are deficient in ears and nostrils, others are destitute of eyes, and some appear reduced to the sense of feeling only, but this last is never wanting.

The impressions made upon the external organs of sense are conveyed by the nerves to the central masses of the nervous system, which consist, in the higher animals, of the brain and spinal marrow. The more elevated any animal is in the scale of creation, the greater volume of brain does it possess, and the more is the sensitive capacity concentrated as to a focus, there; this sensorium is, in them, seated in the head, as are also the principal organs of sense; in the more subordinate races of animated beings successively, the medullary masses are more and more equally dispersed; and in the

most imperfect genera the nervous substance seems mixed up and confounded with the general substance of the body.

When a volition, or determination of the will is excited in an animal, by means of sensation or otherwise, it is, as has been observed, communicated to the muscles, through the medium of the nerves. These muscles are bundles of fleshy fibres, the contractions of which produce the various movements of the animal body. Every extension of the limbs, every elongation of parts, as well as the shortenings and bindings, are occasioned by muscular contraction. The number and direction of the muscles in every animal are regulated by the motions it may have to execute, and vary with the powers of motion peculiar to every species; when it is necessary that the motions should be performed with vigour, the muscles are annexed to hard parts, which are articulated generally one upon another, and which may be considered as so many levers. These parts in the vertebrated animals are called bones, they are internal, and composed of a gelatinous mass, interspersed with particles of phosphate of lime. They are termed shells, crusts, scales, in the mollusca, the crustaceous tribes, and insects, where they are external and composed of calcareous or horny substances, transuded between the skin and the epidermis.

The fleshy fibres are annexed to the hard part, by means of other fibres of a gelatinous character,

which appear to be continuations of the former, and are denominated tendons.

The structure or configurations of the articulated surfaces of these hard parts restrict their motions to certain directions, and they are further restrained by bundles of strong and unyielding cords called ligaments, attached to the sides of the articulations. It is according to the various dispositions of such bony and muscular apparatus, and according to the form and proportion of the limbs resulting from them that animals are able to execute the varied motions which enter into the exercise of walking, leaping, flying, and swimming.

The muscular fibres appropriated to digestion and circulation are not subservient to the influence of the will. Nerves, however, are attached to them, but, as before observed, conformed and arranged with the evident intention of withdrawing them almost totally from this influence. It is only in the paroxysms of passion, and other violent affections of the mind, that volition bursts as it were through the barriers, and extends its empire over these forbidden regions; but the effect of this irregularity is, for the most part, to produce nothing but disorder and confusion in the functions of vegetative life. These functions are likewise unaccompanied by sensations, except in a state of indisposition. Digestion is usually carried on without the consciousness of the animal.

The food, divided by the jaws and teeth, or

sucked in when the animal takes it in a liquid form, is swallowed by muscular motion of the hinder part of the mouth and of the throat, and deposited in the upper region of the alimentary canal, which usually consists of one, and sometimes of many stomachs; there the food is penetrated by juices calculated to dissolve it; carried then into the remaining part of the canal it receives an accession of other juices to complete its preparation for being absorbed; the coats of this canal are porous, and thus absorb from the alimentary mass such parts as are suitable for the purposes of nutrition; the useless residue is rejected by muscular action in the form of excrement.

The canal in which this first act of nutrition is performed is a continuation of the skin, and is composed of similar laminæ. The very fibres which surround it are analogous to those which are attached to the internal surface of the skin, and which are sometimes called the fleshy pannicle. A transudation takes place through all the interior of this canal, bearing a strong relation or sympathy with the cutaneous perspiration, for it always becomes more abundant when this latter secretion is diminished or suppressed. The absorption of the skin bears likewise a strong analogy to that of the intestines.

It is only among animals of the very lowest rank that the excrement passes off by the mouth, the intestines in such creatures having no other outlet.

Those in which the nutritive juices, absorbed by the coats of the intestines, are immediately dispersed through the porous regions of the whole body are more numerous, inasmuch as the whole class of insects appears to come under this description.

But in some of these, including arachnoides and worms, the nutritive fluid circulates through a system of covered vessels, from the final branches of which the nutritious particles are dispersed to the several parts requiring their sustenance. The vessels which thus convey the nutritive fluid are denominated arteries, and those which return it to the centre of the circulating system receive the appellation of veins. The circulating vortex, or round in which the nutritive fluid travels, is sometimes perfectly simple, sometimes it is two, and sometimes threefold, if we include the *vena portarum*. The rapidity of its motion is often accelerated by the contractions of certain fleshy preparations termed hearts, situated at one or the other of the two central points of the circulating system, and occasionally at both.

In the vertebrated red-blooded animals the nutritive fluid issues from the intestines of a white colour, and has then the name of chyle. It proceeds through certain vessels called lacteal into the venous system, where it is mingled with the blood. Vessels similar to the lacteal, and forming by their assemblage what is termed the lymphatic system, carry into the blood the remnant of the nutritious

particles, and the results of the cutaneous absorption.

That the blood may be in a fit state to nourish the respective parts of the body, it is necessary that by the action of respiration, through the medium of the surrounding element, it should undergo the modification before alluded to. In animals possessing a circulating system, a portion of the vessels are destined to carry the blood into certain organs, where it is thinly spread over a considerable surface, the better to receive the necessary action of the surrounding element. When the local habitation of the animal is the land, this surface is hollow, and is called the lungs; but it juts out, when the animal resides in the water, and is then termed gills. There are always certain organs of motion provided to propel the surrounding element, whether air or water, into or upon the organs of respiration.

In animals without a circulating system the air is diffused through all the parts of the body by elastic vessels called tracheæ, or the water acts upon them either by penetrating the body by means of certain vessels, or simply by bathing the surface of the skin.

The blood, after having been subjected to the action of respiration upon it, is in a proper state to renovate the composition of the various parts of the body, and to perform the function of nutrition properly so called. The facility the blood possesses

of decomposing itself* in every part of the body, so as to leave to each the kind of particles adapted to renovate and sustain it, is the standing miracle of vegetative life. The only arrangement for the nutriment of the solids is a grand subdivision of the final branches of the arteries. The preparations for producing the fluids are more various and complicated; sometimes the final extremities most minutely ramified are spread over considerable surfaces, from which the fluid is exhaled. At other times the liquid runs out from the bottom of small cavities. But most commonly the arterial extremities, before they are changed into veins, form peculiar vessels for the conveyance of the liquid produced, and which indeed appears to spring at the precise point where the two sorts of vessels unite; there do the blood vessels and arteries form together, by their interlacing, certain bodies which are denominated the conglomerate or secretory glands.

In animals destitute of circulation the various parts are bathed, as it were, in the nutritious fluid †, and each derives the particular particles necessary for its support. If it be requisite that any particular

* Or rather the facility with which the blood furnishes the particles requisite to sustain the integrity of the textures, owing to the action exerted upon it by means of the vital influence, with which the capillary vessels and the tissues are endowed.

† The various parts of such animals, in consequence of the vital principle with which they are endowed, imbibe and assimilate those particles of the nutritious fluid surrounding them, which most readily supply the waste of their textures.

liquid should be produced, vessels proper for the purpose are found floating in the nutritive fluid, and propel through their pores the elements requisite for the composition of such liquid.

Thus it is that the blood incessantly renovates the composition of the various parts of the body, and restores it to its original state, from those losses and alterations which are the necessary consequences of the exercise of the animal functions. We can form a tolerably clear idea of this operation in the general, though our insight to its details is very indistinct, and though our ignorance of the precise proportions of chemical composition of each individual part prevents us from learning with exactness the transmutations which are necessary for its sustentation. Besides the glands, which separate from the blood those liquids necessary to the internal economy of the animal system, there are others which secrete such fluids as are destined for rejection.

In the function of generation there is one phenomenon, which presents us with a difficulty of a very different description from that which secretion offers to our conception. This phenomenon is the production of the germ, and in truth, it must be regarded as almost incomprehensible. Admitting, however, its existence, without attempting to account for it, we shall experience no particular difficulty in tracing the remaining part of the process of generation. As long as the germ adheres to the parent, it is nourished as an integral part of that

parent's body; the moment it is thence detached, it receives a distinct life of its own, resembling that of the parent in most of its essential elements.

But the germ, the embryo, the fœtus, and the new born animal, never possess the perfect form of the adult, and sometimes the difference is so considerable, as to permit us to give the final change to their perfect form the name of a metamorphosis. Thus, for example, it would be impossible, unless we were aware of the fact from previous observation or information, to divine or conceive, that a caterpillar could ever become a butterfly.

All living beings are more or less metamorphosed in the progress of their growth to maturity; certain parts are lost, and others more completely developed in the course of their advancement. The antennæ, the wings, all the parts of the butterfly, were enclosed within the skin of the caterpillar; with that skin disappear the jaws, the feet, and other organs which belong not to the butterfly. The feet of the frog lie concealed under the covering of the tadpole, and when the latter becomes a frog it loses the tail, the mouth, and the gills. The infant at its birth loses the placenta and the caul; at a certain age it loses almost entirely the *tymus*, and gains, by degrees, hair, teeth, and beard; the body augments more than the head, the head more than the internal part of the ear, *&c.*

A rapid sketch of the intellectual functions of Animals

The impression of external objects upon the individual, the production of sensation and of ideas, involve to our understanding an hitherto impenetrable mystery. The hypothesis of materialism is as little calculated as any other for the solution of this problem, and is in fact the more rash and unsatisfactory, inasmuch as philosophy is unable to produce any direct proof of the real existence of matter. But it is the business of the naturalist to examine how far sensation may be modified by the arrangement and composition of mere material parts, to pursue the operations of intellect to their utmost point of elevation in every living being, and to ascertain whether the degrees of their perfection do or do not depend upon the organization of the species, are or are not affected by the momentary state of the material body.

Perception, generally speaking, depends upon an uninterrupted communication of the nerves from the external organs of sense to the central masses of the medullary system. Hence it appears that the modifications experienced by these central masses are the real immediate objects of perception to the mind, and accordingly we find that perception may also be produced without the affection of the external organs, and originate therefore in the nervous chain of communication, or in the central masses them-

selves. Dreams, visions, and many casual sensations exemplify the truth of this observation.

By central masses we mean, a certain portion only of the nervous system, which is always more circumscribed in proportion to the greater perfection of the animal. In man it is exclusively a restricted portion of the brain, but the entire brain, and the medullary composition of each part separately considered form the sensorium of reptiles, consequently the absence of the brain in them does not destroy the faculty of sensation. The sensitive power is still more diffusely extended among the inferior classes of animals.

The perception acquired by the mind produces

This passage in the original is equally obscure with the subject, and as we do not profess to have a clear satisfactory notion of either, a translation as literal as possible has been adopted. For the satisfaction of the reader, however, we shall subjoin the passage in French, and crave his indulgence for hazarding a few remarks of our own.

"La perception acquise *par le moi* produit l'image de la sensation eprouvée. Nous reportons hors de nous la cause de la sensation, et nous nous donnons ainsi l'idée de l'objet qui l'a produite. Par une loi necessaire de notre intelligence, toutes les idées d'objets materiels sont dans le temps et dans l'espace."

There is nothing in all the economy of nature more mysterious, than the manner in which the mind acquires its notions of external objects, and its belief in their existence. Volumes have been written, and the most ingenious philosophers have laboured in vain to explain the *modus operandi* of perception, but the wisest have agreed to consider it as a mystery, placed beyond the limits of human comprehension. In the brief passage above quoted our author makes an abortive attempt to elucidate the mystery, and presents us with a sort of theory of perception, which appears, to us at least, quite destitute of proof. His meaning, if

the image of the sensation experienced. We then as it were gather from without us the cause of the sensation, and thus produce within the idea of the object which has occasioned it. By a necessary law of our intelligence, all the ideas of material objects are in time and space.

we gather it aright, appears to be to this effect: the mind, or percipient faculty, perceives nothing but the modification or alteration which the sensorium undergoes. Consequent on this perception is what M. Cuvier terms the image of the sensation there experienced: finally we travel out of ourselves for the cause of this sensation, and assign it to some material object, an idea of which object is then produced within our minds. Now, for the existence of these images and ideas which M. Cuvier adopts as the media of communication, between the percipient faculty and the material world there is not an iota of evidence. This doctrine bears too much analogy to the exploded and metaphysical jargon of sensible and intellectual species. The opinion, too, that the mind, the *moi*, can perceive nothing but the alterations of the sensorium, or as Cuvier has it, the modifications of the central masses of the medullary system, is likewise unsupported by adequate proofs. Such alterations are indubitably the immediate objects of perception to the mind, and through their medium, however inexplicable it may be, the mind discerns external objects, and is irresistibly impelled by a primary law of its nature to believe in their external existence.

We may further observe that the language employed in the above passage is very loose. What is meant by the image of a sensation? and by the image being produced by an acquired perception?

The conditions of perception are a percipient faculty, a sensorium, a nervous uninterrupted chain of communication, and external organs; all these conditions are essential to the perception of material objects. An impression is first made on the external organs of sense, and is communicated by the nervous chain acting as a conductor to the sensorium, when a twofold perception is acquired by the mind; the first is that of a certain modification which the sensorium has undergone, through the agency of the nervous conductor, which modification conjoined with percep-

Impressions are left upon the medullary masses by the modifications they have thus experienced, which are capable of reproduction, and thus recall to the mind its former images and ideas. This it is which constitutes memory, a faculty therefore depending upon organization, and varying considerably, according to the age and health of the individual.

tion is called a sensation; and the second is a perception, of something external to ourselves, which we assign as the cause of the sensation experienced; and this is perception properly so called. The perception of the external object generally follows the sensation so instantaneously as to engross the whole attention of the mind, except in cases where the latter is remarkably acute. Instantaneous, however, as it is, it is by no means a simple operation, and, in the earlier stages of our existence, is progressive and slow. Our knowledge of any external object being gained through the medium of different senses, the idea of that object must of necessity be complex, though apparently uncompounded. One quality of an object is acquired by one sense, and another by a different sense; yet when the same object is presented afterwards to any one of our senses, we immediately recal to mind all the qualities that we have discovered in it through the medium of the others. This is one of the phenomena of association.

The perfection of every animal depends mainly upon the extent, vividness, and accuracy of its perceptions. Though some surpass man in the acuteness of certain of their senses, we have no reason to suppose that any equal him in the comprehensiveness and correctness of his general perceptions, that is, in the result of all the senses combined. The superior acuteness of his percipient faculty raises man infinitely above all other animals, and would still raise him above them even were his external organs or instruments of perception less perfect than they are. As we descend in the scale of creation, we find the perceptions of the animal world grow much more circumscribed, and among the lowest tribes we have reason to believe that little more exists than mere sensation.

Ideas, between which some similarity exists, or which have been acquired at the same period of time, have a tendency to recall each other to the mind. This tendency is termed the *association of ideas*, and in its order, extent, and quickness does the perfection of memory consist*. Each individual object is presented to the memory with all its peculiar qualities, or, to use more philosophic language, with all its accessory ideas.

The understanding possesses the power of separating these accessory ideas from the objects of thought, and of uniting together, under a *general idea*, such qualities as are found to be alike in a diversity of objects. The power of framing this general idea, to which no corresponding type is to be found in actual existence, is usually denominated *abstraction*.

As every sensation is attended either with pleasure or pain, in greater or less degrees, so experience and repeated trials readily point out the means necessary to procure the one and avoid the other. The understanding, then, forms general rules for the direction, in this respect, of the *will*.

As an agreeable sensation may be followed by those which are unpleasing, and *vice versâ*, we find

* To enumerate all the sources of association would be difficult, if not impossible. The earliest, and in uncultivated minds, the most usual bond of union between the objects of thought is contiguity in time or place; then follow resemblance and contrariety, cause and effect, means and end, premises and conclusions, &c. To this associative principle some philosophers have referred all the operations of the intellect, and, in fact, every thing in man, from simple sensation upwards.

that the subsequent sensations become associated with the idea of the primitive one, and thus occasion certain modifications of those general rules which the understanding has framed for the rule of the conduct. This is *prudence.*

From the association of the rules just mentioned to general ideas, certain formulæ or modes of thought result, which are easily adapted to particular cases: to these we give the name of reasoning.

A lively remembrance of original and associated sensations, and of the impressions, the pleasure and pain attached to them constitutes what is called imagination,

Man, a being of superior privileges, possesses the faculty of associating his general ideas with certain images more or less arbitrary, easily capable of being impressed on the memory, and useful for recalling to the mind such general ideas as they may be intended to represent. To these images we give the name of *signs* or *symbols.* Their assemblage forms a language. When language is composed of symbols addressed to the sense of hearing, it is called speech: when they relate to the sense of seeing they are denominated *hieroglyphics.* Writing is a series of the latter sort of symbols, by which we represent the elementary sounds, and, by their combination, all those other symbols which relate to the sense of hearing, and of which speech is composed. Writing, therefore, is not a direct but a *mediate* representation of ideas.

The system of representing general ideas by associated signs or images, enables us to retain such ideas distinctly in the memory, and to recal them without confusion: it furnishes to reason and imagination an immense storehouse of materials, and affords a medium of communication which enables the whole species to participate in the experience of each individual; and by its means knowledge may be raised in the progress of time to an indefinite point of elevation. It forms, in fine, the distinctive character of *human* intelligence.

Although the most perfect of other animals are infinitely below mankind in their intellectual faculties, it is nevertheless certain that they perform intellectual operations similar to ours in kind, though not in degree: they move in consequence of sensations which they have received: they are susceptible of lasting affections: they acquire knowledge by experience, according to which they regulate their conduct independently of the immediate impulses of pain and pleasure, and evidently with a consideration of consequence: they feel their subordination in a domestic state: they know that the being who punishes them may refrain from doing so if he will, and accordingly in his presence they assume a suppliant air, when conscious of their own culpability, or at least fearful of his anger: they are improved or corrupted in the society of man: they are capable of jealousy and of emulation: among themselves they possess a natural language, which is nothing indeed

but the expression of their momentary sensations, but still they can learn from man some degree of knowledge of his much more complex and artificial language, through the medium of which he makes his commands known to them, and determines their execution.

In short, we perceive in the superior animals a certain degree of reason, with the consequences, both good and bad, resulting from the exercise of that faculty in man. It resembles the dawning of intellect in the infant mind previously to the acquirement of speech. In proportion as we descend in our observations to animals more and more remote from man, we find a corresponding diminution of intellectual power; till in the lowest classes we can only recognise a few equivocal signs of the existence of mere sensibility, or, to speak more definitely, certain languid motions, which they appear to employ for the purpose of escaping from pain. The gradations, however, between the two extremes of the animal world are innumerable.

In a great number of animals there also exists a faculty essentially different from any thing like human intelligence, denominated *instinct*. This faculty impels them to the performance of certain actions necessary to the preservation of the species, but frequently altogether foreign to the apparent wants of the individual. The operations of this faculty are often extremely complicated, and discover a foresight, skill, and knowledge so infinitely beyond what

the species executing them manifest in all other respects, that they can never be referred to the principle of reason. Neither can they be considered as the effects of imitation, for in many cases the individuals performing them have never seen them performed before, yet are they not the less exact on that account. The actions of instinct of all the species bears so little proportion to the general intelligence of each, that the animals which evince, in regard to their instincts, the greatest seeming wisdom and real contrivance, discover upon all other occasions the utmost stupidity. Different instincts are also so exclusively the property of each species, that all the individuals of it, preceding, contemporary, and successive, carry them on precisely in the same manner without improvement or deterioration. Thus the working bees since the commencement of the world have always constructed their ingenious edifices in conformity with the rules of the highest geometry, which are destined to the reception and accommodation of a posterity not even their own. The solitary bees also and the wasps form extremely complicated nests, in which are deposited their eggs; from these in due time break forth a worm which probably never beholds its parent, and is certainly in that state incapable of constructing a prison-house similar to that which held it; but this worm, the moment its metamorphosis is completed, and it is become a bee, will immediately construct a nest precisely and in all points similar, in which to deposit its own egg.

We can form no clear notion of the immediate cause of instinct, other than by admitting that animals subject to it have in their sensorium images or sensations, which are innate and perpetual. By these, those particular modes of action must be determined, in the manner the common modes are by ordinary and accidental sensation. The individuals are haunted, as it were, by a perpetual dream or vision, and in every thing that has reference to their instinctive peculiarities they may be considered as a kind of somnambulists. Instinct has been granted to animals to supply the deficiencies of intelligence, and to unite with it and with physical strength and fecundity in the preservation of all the species, to the extent prescribed by the fiat of the Creator.

Instinct is not ascertained to be characterized by any visible mark in the conformation of the animal; but intellect, as far at least as we can observe, bears a constant proportion to the relative magnitude of the brain, and particularly of its two hemispheres.

Of method, or system, in its application to the Animal Kingdom.

After what has been said concerning systems in general, it remains now to examine what are the most influential characters in the animal creation, which may be selected as proper foundations whereon to rest the primary divisions of this portion of natural history.

It is evident that such characters must be derived from the animal functions of sensation and motion, for these not only constitute and create an animal, but also by their greater or less capacity may be said, in some measure, to establish the degree of its animality. This position is confirmed by observation, inasmuch as we find that the degrees of development and complication of the animal functions bear a true proportion with those of the organs, which execute the mere vegetative functions of life.

Heat and the organs of circulation form a kind of centre for the vegetative functions, as the brain and the trunk of the nervous system do for the animal ones; for as we trace the animal tribes, from the superior to the inferior, we find these two systems grow gradually more imperfect in an equal proportion, and finally disappear together. In animals the lowest in the scale, where the nerves are no longer visible, the fibres also cease to be distinct, and the organs of digestion are nothing more than simple cavities in the homogeneous mass of the body. In insects the vascular disappears even before the nervous system; but, in general, the dispersion of the medullary masses is simultaneous with that of the agents of muscular motion: a spinal marrow, upon which a certain number of knots, or ganglia, represent so many brains or seats of sensation, corresponds with a body divided into numerous rings, and supported upon

many pairs of limbs, distributed along its extent in length. A similar correspondence is observable through all the animal tribes.

This relative proportion in the structure of animal forms in general, which results from the arrangement of the motory organs, the distribution of the nervous masses, and the energy of the circulating system, should constitute the only basis upon which the primary divisions of the animal kingdom may be founded.

We shall examine in the sequel successively, under each of these primary divisions, what are the characters next in importance to those just alluded to, and which are therefore proper to follow in succession, as distinctive of the subdivisions of the animal kingdom.

General distribution of the Animal Kingdom into four grand divisions.

If we divest ourselves of prejudices founded on the divisions of the animal kingdom formerly recognised, and consider animals without reference to their relative size or utility, our own degree of knowledge respecting them, or any other extraneous circumstances, we shall find that there are four principal forms after which all living beings appear to have been modelled. The basis of these distinctions is laid on the nature and organization of the several creatures themselves: the ulterior divisions

of them, with whatever names they may have been decorated, are but slight modifications of the primary: and consist entirely in the addition or development of certain parts which make no essential change in the general character of their conformation.

In the first of these general forms or models, including that proper to man, and the animals resembling him most nearly, the brain and the chief trunk of the nervous system are inclosed in bony coverings, the former called the cranium, and the latter the vertebra. To the sides of the vertebra, as to a central column, are attached the ribs and the bones of those limbs, which form as it were the framework or carpentry of the body. The muscles generally speaking, form a second covering for the bones which they put into action, and the viscera are inclosed in the head and trunk.

Creatures of this form are denominated "*vertebrated animals,*" (*animalia vertebrata.*)

These have all red blood, a muscular heart, a mouth with two horizontal jaws, distinct organs of vision, smell, hearing, and of taste, situated in cavities of the head, and never more than four limbs. The sexes in these animals are invariably separated, and a similar distribution prevails among them of the medullary masses, and of the principal branches of the nervous system.

On a close examination of each of the parts of this grand system we shall discover a general analogy

of conformation even in the species most remote from each other; and can easily trace the gradations of the same plan from man to the lowest of the fish.

In the conformation peculiar to the second grand division of living beings, we find no skeleton. The muscles are simply attached to the skin which forms a soft and contractile covering, from which proceeds, in several of the species, a scaly or laminous substance called shells, the position and production of which are analagous to those of the mucous body. Within this general *envelope* are the viscera and nervous system, which last is composed of many scattered masses, attached together by nervous threads. The chief of these masses placed in the œsophagus receives the denomination of the brain. Of the senses, properly so called, we can seldom distinguish, among these animals, more than the organs for those of taste and vision, and we sometimes find that even these are wanting. One family alone exhibits the organs of hearing. In other respects this division is characterized by a complete circulating system, and peculiar organs of respiration. The apparatus for digestion and secretion are scarcely less complicated than are those of the vertebrata.

We give to the animals whose conformation is modelled according to this second form, the appellation of *Mollusca*.

Although the general plan of their organization is not so uniform as that of the vertebrata in relation

to external configuration of parts, yet even here the degree of resemblance is generally analogous, both as to structure and functions.

The third general form is that of insects, worms, *&c.* Their nervous system consists of two cords extending along the belly, and swelled out at regular intervals into knots or ganglia. The first of these placed on the œsophagus, though called the brain is not much larger than the rest. The covering of their body is divided by transverse folds into a certain number of rings, the teguments of which are in some hard, and in others soft, but the muscles are invariably attached to their interior. We often find articulated limbs attached to the sides of the body or trunk, but it is as frequently destitute of any.

This division we denominate "articulated animals," *(animalia articulata.)*

It is in these animals that we can observe the transition from the circulating system in closed vessels, to a nutritive process performed by simple imbibition, and likewise a transition corresponding to this from the resparatory system in organs confined to certain parts, to the same operation performed through the medium of trachæ, or air-vessels dispersed through the entire body. The organs of taste and sight are the most distinct among the articulated animals. A single tribe possesses those of hearing. The jaws of this division, when any are to be found, are invariably lateral.

The fourth and last form comprehends the entire of those animals usually known under the name of

zoophytes, and which may also be termed with propriety "radiated animals," (*animalia radiata.*)

In the three divisions preceding this the organs of motion and sensation, are symetrically disposed, as it were on the two respective sides of a certain axis. In this last, similar organs have a circular arrangement round a common centre. The zoophytes, in truth, approach nearly to the homogeneous character of plants. They possess neither a nervous system sufficiently distinct, nor particular organs of sensation. In a few of them we may discover with difficulty, some vestiges of circulation. Their resparatory organs are generally upon the surface of the body. The intestines of the great majority consist of a sort of bag, through which there is no passage, and those which are lowest in the animated series exhibit nothing but a kind of homogeneous pulp possessed of motion and sensibility*.

* Before our author's time naturalists generally divided all invertebrated animals into two classes, insects and worms. He commenced an attack on this division, and produced another in a memoir read to "the Society of Natural History at Paris," the 10th of May, 1795, and printed in the *Decade Philosophique*, where he accurately distinguished the characteristics and limits of mollusca, crustacea, insects, worms, echinodermes, and zoophytes. In a memoir read to the Institute the 31st of December, 1801, he ascertained the red-blooded worms or annelides. Finally, the Baron separated these various classes into three branches, each of them analagous to a branch of the vertebrata, in a paper read to the Institute in July, 1812, and afterwards printed in the Annals of the Museum of Natural History, Vol. xix.

THE FIRST GRAND DIVISION OF THE ANIMAL KINGDOM.

THE VERTEBRATED ANIMALS.

The body of the vertebrated animals is sustained by a skeleton, composed of many pieces, connected together, and moveable one upon another. They, have therefore, both certainty and strength in all their motions; the solidity of this support also enables them to attain to considerable bulk, and it is in this division of the animal world that are found creatures of the largest dimensions.

The circumstance of their nervous system being more concentrated, and the central parts of it more voluminous, appears to give to their mental susceptibility more energy and durability, whence also seems to result an intelligence more perfect than in other animals, and more capable of improvement.

Their body is composed of a head, a trunk, and limbs.

The head is formed of the skull which encloses the brain, and of the face, composed of two jaws. In the face are inserted the organs of sense.

The trunk is sustained by the spine of the back and by the ribs.

The spine is composed of vertebræ that move upon

each other, all of which have a cylindrical opening in the middle, forming together a canal which contains that general mass of the nervous system, called the spinal marrow. The spine frequently passes the lower extremity, and is prolonged into a tail.

The ribs are semicircular, and secure the sides of the cavity of the trunk. They are most commonly articulated by one extremity to the vertebrated chain, and by the other to the sternum. In some species they are scarcely visible.

They have never more than two pair of limbs. Sometimes, indeed, one or other of these pairs is deficient, and sometimes both. They assume such forms as are adapted to the peculiar motions they have to perform: thus the anterior limbs may be converted into hands, feet, wings, or fins; the hinder into hands, feet, or fins.

The blood of these animals is always red, and seems, by its composition, adapted to sustain the energy of sensation, and the muscular vigour which characterize them. The different degree, however, of this character of their blood, and its correspondence with the portion of respiration necessary to the several kinds of vertebrated animals have suggested the subdivision of them into four classes.

The external organs of sense in all the vertebrated animals are two eyes, two ears, two nostrils, the teguments of the tongue, and the teguments of the entire body. The nerves run into the marrow through apertures in the vertebræ, and in the cranium. They all appear to unite in a double bundle,

which indeed constitutes the marrow, and which, after having crossed its filaments, spreads out in order to form the different tubercles which compose the brain, and to terminate in two medullary cavities, called hemispheres, the volume of which is usually proportioned to the extent of intellectual capacity.

There are always two jaws: the principal motion exists in the lower, which has the power of elevation or depression. The upper jaw is sometimes completely fixed and motionless. Both are generally provided with teeth, excrescences of a peculiar nature, very similar to the character of the bones, as far as the chemical composition is concerned, but which grow from certain beds, and by means of the process of transudation. The jaws of one entire class, however, (that of birds) are invested with a horny substance, and the genus of the tortoise in the class of reptiles, is in a similar situation.

The intestinal canal extends from the mouth to the anus in various degrees of expansion or contraction, possessing certain appendices, and receiving liquids of a solvent nature, some of which, being poured into the mouth, are called saliva; others, which enter the intestines only, have several names. The two principal are the secretion of the gland denominated pancreas; and the bile, which is produced by another considerable gland called the liver.

During the passage of the food through the ali-

mentary canal, the part of it adapted to the purposes of nutrition, and termed the chyle, is absorbed by the lacteal vessels and carried into the veins. After each part has received its proper degree of nutriment, the residue is carried back into the veins by means of a set of vessels analogous to the lacteal, and which together form what is usually denominated the lymphatic system.

The veins carry back to the heart the blood which has served the purposes of nutrition, and which has been repaired by the chyle and lymph. This blood, however, must pass either totally, or partially, into the organ of respiration, for the purpose of resuming its arterial character, before it is carried back by the arteries to the different parts of the body. In the three first classes of vertebrated animals, the organ of respiration consists of lungs, which are an assemblage of small cells penetrable by the external air. In fishes alone respiration is performed by gills, or a series of laminæ, between which the water passes.

In all the vertebrated animals the blood which furnishes to the liver the materials of the bile is supplied from that venous blood which has circulated in the intestines, and which, after being re-united in a trunk called the vena porta, is again sub-divided at the liver.

All these animals have likewise a peculiar secretion called the urine, which is formed by two large glands attached to the sides of the spine, called kidneys. The fluid secreted by these glands

is usually collected in a reservoir named the bladder.

The sexes in this division are separated. The female has always one or two ovaries, from which the eggs are detached at the moment of conception. The modes in which fecundation is performed are various in the different classes.

Subdivision of the vertebrated Animals into four Classes.

We have just considered the general resemblance existing throughout the vertebrated division of the animal kingdom. The various beings of which this division is composed present, nevertheless, to our notice, certain differences or peculiarities which give rise to four principal divisions or classes. These differences depend upon the nature and the energy of their movements, which again are always proportioned to the quantum of respiration, for it is respiration which imparts to the muscular fibre the degree of its irritability through the medium of the blood and nervous system.

The quantity of respiration depends upon two causes: first, the relative portion of blood contained at every given instant of time in the respiratory organ; and secondly, the amount of oxygen which enters into the composition of the circumambient fluid.

The quantity of blood is altogether determined by the peculiar disposition of the organs of respiration and of circulation.

The organs of circulation may be double, so that all the blood transported by the veins from the different parts must undergo a process of circulation in the respiratory organ before it can be returned by the arteries; or they may be simple, in which latter case a portion of the blood only which returns to the body passes through the organ of respiration.

This last is the case of reptiles. The quantity of their respiration, and all the qualities depending on it, vary with the relative proportion of blood returned at each pulsation into the respiratory organ.

Fishes have a double circulation, but as they respire through the medium of water, and their blood consequently receives only the portion of oxygen which is mingled with their circumambient element, the quantity of their respiration is, perhaps, still less than that of reptiles.

In the mammalia the circulation is double, and the respiratory process simple, that is, it is performed by the lungs alone. The quantity of their respiration is superior to that of reptiles, by reason of the form of their circulating organ, and to that of fishes from the nature of the surrounding element which they respire.

But the quantity of respiration in birds is still greater than that of quadrupeds, because they possess not only a double circulation and an aërial respiration, but also because they respire by various other cavities as well as the lungs. The air penetrates through their whole body and acts upon the

branches of the aorta with the same efficiency as upon those of the pulmonary artery.

From all this result four different kinds of motion for which the four classes of vertebrated animals are severally and exclusively designed. Quadrupeds, in which the quantity of respiration is moderate, are formed for walking and running, and their predominant characteristic is vigour. Birds, whose respiration is greater, possess the lightness and strength of muscles necessary to support them in their airy flight. Reptiles, which respire more feebly, are doomed to creep upon the earth, and many of them pass more or less of their allotted period of existence in a kind of stupor. Finally, fishes, which move in a fluid almost as specifically heavy as themselves, are enabled to execute their peculiar motions by an arrangement altogether different from the rest.

Every peculiarity of organization proper to each of these classes, and especially such as belong to motion and external sensation, have a close and necessary relation with the essential characters of each just enumerated.

In the mammalia, however, there are also certain other peculiarities besides the above relative characters. These are their viviparous generation; the mode in which the fœtus is nourished in the womb by means of the placenta; and the teats, by which they afford nutriment to their young.

The other three classes on the contrary are oviparous, and when compared with the mammalia,

exhibit a plan of organization peculiarly proper to themselves in the vertebrated division of the animal creation.

THE FIRST CLASS OF VERTEBRATED ANIMALS.

THE MAMMALIA.

THE mammalia are placed at the head of the animal kingdom, not only because it is the class to which we ourselves belong, but also because all the species included in it enjoy the most numerous faculties, the most delicate sensations, and the most varied powers of motion; and because all their different properties combined appear to produce in them a more perfect intelligence. Hence are they more fertile in resources, less subjected perhaps to the influence of instinct, and altogether more capable of improvement.

As the quantity of respiration in the mammalia is moderate, so generally speaking, these animals are formed for walking on the earth, but, at the same time with great force and permanence of exertion. To this end all the articulations of their frame have strictly defined conformations, which determine all their motions with rigorous precision.

Some, however, can raise themselves in the air by means of limbs considerably elongated, and connected by extensible membranes. Others, again,

have their limbs so much shortened that they can move with facility in the water only, but these circumstances by no means deprive them of the essential characters of the class to which they belong.

In the whole of this class the upper jaw is fixed to the cranium; the lower is composed of two pieces articulated to a condyle, which juts out into a fixed temporal bone. The neck is composed of seven, and in one species of nine, vertebræ. The anterior ribs are attached to a sternum formed of several pieces placed vertically. Their anterior extremity commences from a shoulder-blade not articulated to any other bone, but simply suspended in the flesh, often indeed resting on the sternum by an intermediate bone denominated the clavicle. This extremity is continued by an arm, a forearm, and a hand, itself formed of two ranges of little bones called the carpus, another range of bones called the metacarpus, and the fingers each composed of two or three bones called phalanges.

The posterior extremity of all this class, if we except the cetacea, is fixed to the spine where it forms a girdle, or pelvis, which, in youth, is divided into three pairs of bones, the ilium which is attached to the spine; the pubis which forms the anterior girdle; and the ischion which forms the posterior. At the point of union of these bones is situated the cavity wherein the thigh is articulated, to which again is attached the leg composed of two bones, the tibia or shin bone and the fibula. The leg is terminated by the foot, the component parts of

which are analogous to those of the hand, and are called the tarsus, metatarsus, and toes.

The head of the mammalia is always articulated by two condyles upon the atlas or first vertebra.

Their brain is composed of two hemispheres, united by a medullary lamina called the *corpus callosum*, containing two ventricles and enclosing four pair of *tuberculæ*, or eminences, named the *corpora striata* or striated bodies, *thalami optici* or optic beds, *nates* and *testes*. Between the optic beds is a third ventricle which communicates with a fourth situated beneath the cerebellum. The crura of their cerebellum always form under the *medulla oblongata* a transverse prominence denominated the *tuber annulare* or bridge of Varolius.

Their eye, lodged invariably in its orbit, and protected by two eyelids and a vestige of a third, has its crystalline humour fixed by the ciliary process. Its sclerotic coat, or investing tunic, is simply cellular.

In their ear there is always found a cavity called the *tympanum* or drum, closed from without by a membrane named the *membrana tympani*; there are also four small bones, called the *incus* or anvil, *malleus* or hammer, *stapes* or stirrup, and *os orbiculare*, or spheroid bone; a vestibule, at the entrance of which is placed the stapes, and which communicates with three semicircular canals; finally, a *volute*, or spiral canal termed the *cochlea*, which terminates, by one of its *scalæ* or canals, in the *tympanum* or cavity, by the other, in the vestibule.

The cranium of the mammalia is divided into three compartments. The anterior is formed of the two frontal bones and the ethmoid; the intermediate by the parietal bones and the sphenoid; and the posterior by the occipital. Between the occipital bones, the parietals, and the sphenoid, are inserted the temporal bones, a part of which properly belong to the face.

In the fœtus the occipital bone is divided into four parts; the body of the sphenoid into two, and three of its pairs of alæ are also separated. The temporal bone is divided into three, one of which serves to complete the cranium, another to close the labyrinth of the ear, and the third to form the sides of its cavity. These parts of the bones of the cranium unite more or less quickly in the different species, and end by perfect union in the adult subject.

The face is formed by two maxillary bones, between which the nasal canal passes; they have the two intermaxillary bones in front, and the two palatines behind; between them descends the single lamina of the ethmoid bone denominated the *vomer*. At the entrance of the nasal canal are the bones proper to the nose; to the external sides of this canal their inferior horns adhere; their superior extremities or horns which occupy its upper and posterior part belong to the ethmoid. The jugal, or cheek bone, of each side unites the maxillary bone to the temporal, and often to the frontal bones. Lastly, the lachrymal occupies the internal angle of the orbit, and sometimes a part of the cheek.

The tongue is always fleshy, and is attached to a bone called the hyoid, suspended by ligaments to the cranium.

Their lungs, two in number, composed of an infinity of small cells, are always enclosed, without adhesion, in a cavity formed by the ribs and the diaphragm, and lined with the pleura.

Their organ of voice is always at the superior extremity of the *trachea* or windpipe; and a fleshy continuation denominated the *velum palati* or soft palate establishes a direct communication between the larynx and the back part of the nostrils.

Living on the earth's surface, these animals are less exposed to the alternations of heat and cold, and consequently their covering, the hair, is of a moderately thick texture, and is not unusually found very slight in the natives of the warmer latitudes. The cetacea, however, which inhabit the water are totally destitute of this covering.

Their intestinal canal is suspended by a fold of the peritoneum, called the mesentery, which contains a number of conglobated glands for the lacteal vessels. Another production of the peritoneum, called the epiploon, hangs in the front of, and underneath the intestines.

The generation of the mammalia is essentially viviparous. The fœtus, immediately after conception, descends into the matrix; enclosed in its membranes, the most external of which, is called the chorion, it attachs itself to the sides of the womb by one or more plexuses of vessels called placentas,

which establish a communication between the embryo and the mother, from whom the former receives its nourishment, and in all probability its oxygenation. The fœtuses have also, at least in the earlier periods of gestation, a vesicle analogous to that which contains the yolk in the oviparous kinds, and receiving supplies in the same manner from the vessels of the mesentery. They have also another bladder corresponding to that of the urine, which has received the name of allantoid.

The young are nourished for some time after their birth, by the milk, a liquor peculiar to this class, which is produced at the very moment of parturition, and for as long after as is requisite for the nutriment of the young. It is from the mammæ or teats that this class is named, this being a characteristic exclusively peculiar to themselves, and consequently fitter than any other external one for the purposes of distinction.

Division of the Class Mammalia into orders.

The most essential differences of the mammalia among themselves are, first, in the organs of touch, on which the dexterity of the animal mainly depends; and secondly, in those of mastication, which determine the nature of the aliment proper to every species. On these essential characters are founded the division of the mammalia into orders.

Every thing relating to the digestive functions is

closely connected with these characters, besides a variety of other comparative differences, not merely physical, but even intellectual.

The degree of perfection of the organs of touch may be estimated according to the number and moveableness of the fingers, and according to the greater or less proportion of depth in which their extremity is enclosed in the claw or hoof.

A hoof which completely envelopes that part of the extremity which would otherwise touch the ground, blunts the power of tact, and renders such extremity incapable of seizing any thing.

The opposite extreme to this is when a nail forms a single lamina on one side of the end of the finger or toe only, leaving to the other all its sensibility.

The nature of the diet may be judged of by the cheek teeth, to the form of which the articulation of the jaws invariably corresponds.

For cutting flesh the cheek teeth are trenchant like a saw, and the jaws are fitted together so as to move in the manner of a pair of scissors, and are incapable of any other motion than that of simply opening and closing again in a vertical direction. The cheek teeth adapted for the mastication of grains or roots, have a flattish round upper surface, or rather the shape of a flat coronet, and the jaws possess the capacity of horizontal motion. That the surface of such cheek teeth should keep that sort of inequality peculiar to a millstone, their substance is composed of parts of unequal hardness, some of which parts wear sooner than others.

The hoofed animals are all of necessity herbivorous, and possess teeth of this description, because the conformation of their feet will not permit them to seize a living prey.

Animals with unguiculated fingers or toes are susceptible of great variations in their modes of subsistence. Independently of the form of the cheek teeth, these animals differ materially among themselves in the power of touch, and the facility with which the fingers or toes can be put in motion.

There is one characteristic which has a prodigious influence on the dexterity of the animals possessed of it, and multiplies greatly, or varies, its modes of action: It is the faculty of opposing a thumb to the other fingers, and of being thus enabled to seize with facility the smallest objects. This it is which constitutes what is properly called a hand, which is found in its highest degree of perfection in the human species, among whom the anterior extremities are altogether at liberty, and are thus capable of being more effectually employed in the act of prehension.

These different combinations, which strictly determine the nature of the various animals of this class have given rise to the following divisions into orders.

Among the unguiculated animals, the first is man, who besides a multiplicity of other infinitely higher privileges is distinguished zoologically by possessing hands at the anterior extremities alone; the posterior being employed to sustain him erect.

Man therefore, though a single species, is formed into a distinct order, when zoologically considered, by this peculiarity; an order which is hence named *Bimana.*

In the next order to man we find hands at the four extremities, whence this order is named *Quadrumana.*

In another order, the animals included in it have no thumb capable of a free motion, or opposable to the rest. This from the nature of its food is named *Carnivora.*

In the above three orders, there are found three different sorts of teeth, namely the maxillares, molar or grinding teeth, which we shall rather call as more generally applicable, the cheek teeth; the canine; and the incisor, or cutting teeth.

The animals which compose the fourth order have the extremities but little different from those of the carnivora: but they want the canine teeth, and have incisors in the front of the mouth, adapted for a sort of mastication altogether peculiar to themselves. This order is called *Glires.*

After these are ranked such animals as have the extremities very much cramped, and sunk deep within large claws considerably crooked. These are moreover, defective in the incisive teeth; some of them even want the canine; and a few are destitute of teeth altogether. From these defects the order is named *Edentata.*

This distribution of the unguiculated animals would be perfect, and form a regular series, if New

Holland had not recently furnished us with a sort of collateral chain, consisting of animals with pouches. The different genera of these are connected by a general similarity of organization, yet one is found, to correspond with the Carnivora, another with the Glires, and another with the Edentata, by the form of their teeth, and the nature of their food.

The hoofed animals are less numerous, and there is less irregularity in their conformations and habits.

Of these, the cloven foot, the upper jaw devoid of genuine incisors, and the four stomachs distinguish one portion as a separate order named, from their also chewing the cud, *Ruminantia.*

The other hoofed mammalia may all be combined into one order, (with the exception of the elephant, which may well be considered as distinct, though connected by some remote relations with it,) and named from the thickness of their integument *Pachydermata.*

Last of all come those mammalia which have no hinder extremities, and whose external conformation and aquatic mode of life would induce us to form them into a separate class, did not all the rest of their economy decidedly mark them as belonging to that now under consideration. They unite the vigour of the other mammalia to the advantage of being sustained upon the watery element, and exhibit to our view the most gigantic forms to be found

in the animal world. They are the hot-blooded fishes of the ancients, and the order is now named *Cetacea.*

THE FIRST ORDER OF THE MAMMALIA.

THE BIMANA, OR MAN.

Man forms but a single genus, and the only genus in the order to which he belongs. As his history is more immediately interesting to ourselves, and forms the proper point of comparison to which the history of other animals should be referred, we shall bestow upon it a proportionate degree of attention.

We shall give a rapid sketch of every thing peculiar in the organization of man, amidst all he shares in common with the other mammalia. We shall examine the advantages he derives from such peculiarities over every other species. We shall describe the principal varieties of the human race and their distinctive character, and, finally, we shall point out the natural order in which the individual and social faculties of man receive their due proportion of development.

The peculiar Conformation of Man.

The foot of man is exceedingly different from that (or rather from the hinder hands) of apes and mon-

keys: it is large; the leg holds a vertical or rectangular position in relation to it; the heel is considerably expanded underneath; the toes are short, and possess but little flexibility; the great toe, longer and larger than the others, is situated on the same level that they are, and cannot be opposed to them in the manner of the thumb of the hand. The foot is peculiarly adapted for the support of the body erect, but is entirely unfit for the purposes of grasping or climbing. The hands, on the contrary, are not calculated for the operations of walking or supporting the body. Man, therefore, is the only biped and bimanous animal.

The body of man is altogether arranged and conformed with a view to its natural erect position. His feet, as just observed, furnish a larger and firmer basis than those of any other animal. The muscles which hold the foot and thigh in an extended state are extremely vigorous, whence proceeds the projection of the calf, and of the buttock. The flexors of the leg are attached very high, which allows a greater means of extension to the knee, and apparent prominence to the calf. The pelvis is large, hence a greater separation of the legs and thighs, and a sort of pyramidical form to the trunk favourable to equilibrium. The neck of the thigh bones form an angle with the body of the bone, which increases still more the separation of the lower extremities, and enlarges the basis of the whole frame. Lastly, the head, in his vertical position, is in a state of equilibrium on the trunk of the body,

be cause its articulation is strictly central in reference to its own bulk.

It would be impossible for man to walk conveniently on all fours, even if he desired to do so: his feet being short, and almost inflexible, and his thigh of too great length, would bring the knee in contact with the ground: his shoulders being too far separated, and his arms too far extended from the central line would form a very ineffectual support for the upper part of his body: the great indented muscle which, like a girth in quadrupeds, holds the trunk of the body suspended between the shoulder-blades, is smaller in man than in any individual among them: the head of man is also heavier, both on account of the magnitude of the brain, and the smallness of the sinuses of the bones of the cranium, and notwithstanding this, the means of supporting it are weaker, for there is neither a cervical ligament, nor such an arrangement of vertebræ as would prevent them from bending forward; the consequence of this would be, that in the position of a quadruped, man could only keep his head in the same line with the spine; his eyes and mouth must infallibly be directed to the ground, and he could scarcely see a step before him, while, on the other hand, in reference to the erect attitude, which is assuredly proper to man, the position of these same organs is precisely what it ought to be.

As the arteries which supply the human brain are not sub-divided, as in most quadrupeds, the

blood necessary for an organ of so much volume, would be poured into it too copiously and rapidly if man should affect the horizontal position; and frequent apoplexies would be the consequence of his folly.

It appears, then, that man is formed to stand and walk upon his feet in an erect posture: his hands are thus left at liberty to be employed in the various arts and occupations of life, and his organs of sense are the most favourably situated for their destined purposes.

The hands, which derive so many advantages from the circumstance of being at liberty, possess as many more from the wonderful mechanism of their structure. The thumb, longer in proportion than that of apes, affords greater facility for seizing and holding small objects. All the fingers, with the exception of the annularis, have separate movements, which is not the case with any other animals, even the quadrumana. The nails being placed at one side only of the extremity of the finger, form, as it were, a kind of support for the touch, without, in the least degree, injuring its delicacy. The arms also, to which these hands are affixed, possess a strong point of attachment in the large shoulder-blade, the powerful clavicle, and the general arrangement of their articulation.

Though man is considerably favoured by nature in the means of dexterity and address, he is not equally so in respect to force and vigour. In swift-

ness of locomotion he is much inferior to other animals of not greater dimensions. He has neither projecting jaws, nor protruding canine teeth, nor nails extended into claws or talons, and is consequently destitute of offensive weapons. He is also almost without defensive arms, as the sides and upper part of his body are literally naked, not being furnished even with a covering of hair. Above all, he is the longest of all living beings in arriving at the full maturity and entire possession of all his faculties and energies, or even in acquiring sufficient force for his own preservation, subsistence and defence.

But he derives additional strength from his very weakness. His external deficiencies oblige him to look within, and to have recourse to that intelligence with which nature has endowed him in so eminent a degree.

No quadruped is comparable to man for the magnitude of the hemispheres of the brain, that is, of the part of this organ which serves as the principal instrument of the intellectual operations. The hinder part of the same organ extends so as to form a second covering for the cerebellum. The very form of the cranium announces this magnitude of the brain, while the comparative smallness of the face displays how little that part of the nervous system which influences the external senses is predominant in the human species.

These external sensations which are less energetic

in man than in some other animals, are nevertheless very delicate, and are admirably balanced among themselves.

His eyes are directed forwards: thus, though he does not see on both sides at once like most quadrupeds, yet, is there a great unity in the result of the visual operation, and the attention is concentrated more effectually on sensations of this kind. The globe and the iris of the eye possess little variation, and this restrains the sphere of vision to a determined distance, and a fixed degree of light.

The couch of his ear possessing but little mobility or extent, does not enervate the intensity of sounds, yet of all animals he can best distinguish the various degrees of intonation. His nostrils, more complicated than those of apes, are less so than those of other animals, yet he appears to be the only living creature whose sense of smell is sufficiently delicate to be affected by unpleasant odours. The delicacy of the smell must have some influence on that of taste, but independently of that, man must possess considerable advantages in this respect, at least, over those animals whose tongues are covered with scales. Lastly, the perfection of his tact results both from the delicacy of his external tegument, the absence of all insensible parts, and the form of his hand so admirably constructed to adapt itself to all the slightest inequalities of surface.

Man possesses a most distinguished pre-eminence in the organs of his voice; he alone can produce articulate sounds. The form of his mouth and

peculiar power of mobility in his lips are, probably, the causes of it. In this gift he possesses a most invaluable medium of communication, for of all the signs which can be employed in the transmission of ideas, the articulate variations of sound are the most perceptible at the greatest distance, and the most extensive in their sphere of operation.

Fruits, roots, and the succulent parts of vegetables, appear to be the natural food for man; his hands afford him a facility in gathering them; and his short, and comparatively weak jaws, his short canine teeth not passing beyond the common line of the others, and his tuberculous cheek teeth would not permit him either to feed on herbage, or devour flesh, unless these aliments were previously prepared by the culinary process.

Once in possession of fire, and assisted by the arts of his own invention, to take animals by stratagem, or kill them at a distance, the whole living world is laid, as it were, at his feet, and the means of multiplying his species are infinitely augmented.

The organs of digestion are in strict conformity with those of mastication. His stomach is simple, the intestinal canal of moderate length, the large intestines well marked, the cœcum short and bulky, and augmented by a thin appendage, the liver is divided into two lobes and a small one, and the epiploon hangs in front of the intestines extending even into the pelvis.

To complete this brief sketch of the anatomical structure of man, we shall merely add that he has

thirty-two vertebræ, seven of which are denominated cervical, twelve dorsal, five lumbar, five sacral, and three cocygical. Of his ribs seven pair are attached to the sternum by cartilaginous elongations, and are called true ribs; the other five pair are called false ribs. There are eight bones in his cranium: the occipital basis, two temporal, two parietal, one frontal, the ethmoid and the sphenoid. The bones of his face are fourteen in number; two maxillary and two jugal, each of which is attached to a maxillary bone by a sort of handle called the zygomatic arch, two nasal bones, two palatal, a vomer between the nostrils, two inferior turbinated bones within the nostrils, two lachrymal at the internal sides of the orbits, and the single bone of the lower jaw. Each jaw has sixteen teeth; four incisors in the middle, two pointed canine teeth at the corners, and ten molar with tuberculous crowns, five on each side, making in all thirty-two.

The shoulder blade at the end of the spine has a tuberosity called acromion, to which the clavicle is attached, and just above its articulation a point denominated the coracoid, for the attachment of certain muscles. The radius turns completely on the cubitus, in consequence of the manner in which it is articulated with the humerus. The carpus has eight bones, four in each range: the tarsus has seven. The remaining bones of the hands and feet respond with the number of toes and fingers.

Physical and moral development of Man.

The number of offspring at each parturition of the human species is usually limited to one. The birth of twins does not occur in more than a single instance out of five hundred, and very rarely indeed is a greater number produced. The period of gestation is nine months. A fœtus of a month old is usually about an inch in length; of two months, two inches and a quarter; of three months, five inches; six or seven inches at five months old; eleven, at seven; at eight months fourteen inches, and at nine eighteen. Those which are born under seven months, seldom continue to live. The milk teeth begin to shoot out in a few months after the birth; at two years old these are twenty in number, and they fall successively towards the seventh year to be replaced by others. Of the twelve back cheek teeth which do not drop out, four appear at about four years and a half old, four at nine years old, the four last do not sometimes make their appearance until the twentieth year.

The fœtus increases more and more in proportion as it approaches the moment of birth, the growth of the child, on the contrary, is in a directly opposite ratio. At its birth it possesses more than one fourth of its destined stature; one half is attained at two years and a half old; three fourths at the age of nine or ten. The growth, in height, not unusually ceases at eighteen. The male of the human species is seldom more than six feet high, and very

rarely under five. The female is generally a few inches lower.

Puberty is usually manifested by external signs in girls at the age of ten or twelve, and in boys from twelve to sixteen. In warmer climates it commences earlier. Both sexes are usually unproductive previously to the period of this manifestation.

Scarcely has the body attained the limit of its height, before it begins to increase in bulk. The fat accumulates in the cellular membrane. Obstruction gradually takes place in the different vessels, the solids grow stiff, and after a life of more or less duration, more or less agitated, more or less painful, old age arrives, and brings in its train infirmity, decay, decrepitude, and death. Few, very few indeed of the human race, pass the limit of a hundred years, and myriads perish long before that period, by diseases, by accidents, or even by old age itself.

The assistance of the mother, in a variety of ways, is indispensible to the infant long after it has ceased to require the nourishment of the breast. An intellectual as well as a physical education is necessary, which also originates a durable bond of attachment between the parent and child. The equality of the sexes in number, and the general difficulty of supporting more than one wife, point to monogamy as the kind of union most proper and natural for the human species. The father takes a part in the education of his offspring. The length of this edu-

cation permits him to have other children in the interval, and thus the perpetuity of the conjugal union appears to be a law decreed by nature. The long period of infantine imbecility gives rise to another natural law, namely, the subordination of each individual family. This again leads, by a necessary consequence, to the entire system of social order, as the descendants who found new families will naturally preserve the relations which arise from long and early habits. The disposition to mutual assistance wonderfully augments and strengthens the resources of intelligence and skill in the human species. It becomes instrumental to the subjection or repulsion of other animals; has enabled man to subsist and propagate under every variety of temperature, and to cover the face of the whole earth with beings similar to himself.

In other respects man appears to possess nothing resembling the instinct of animals. He is not stimulated to any regular continuous exertion of industry by innate ideas. All his knowledge is the consequence of his own sensation, or of those of his predecessors. The results of human experience, transmitted by language, modified by reflection, and applied to our various wants and enjoyments, have originated all the arts of human life, whether useful or ornamental. Language and letters by affording the means of preserving and communicating all acquired knowledge, form, for our species, an indefinite source of perfection.

The gradations, however, in the development of

man, are very distinct and numerous. The early hordes obliged to live by hunting or fishing, or on wild fruits, occupied altogether in the search of subsistence, could multiply but slowly and make but little progress towards civilization. Their arts were confined to the construction of huts and canoes, to covering themselves with the skins of beasts, and to the fabrication of arrows, and of nets. They observed such stars only as guided them in their wanderings, and examined those natural objects alone, whose properties were serviceable to themselves. They domesticated no animal but the dog, for this obvious reason, that nature had given him a tendency to that peculiar mode of life which they themselves pursued. When they had succeeded in taming the herbivorous animals, they found a more secure subsistence in the possession of numerous herds and flocks, and the consequent enjoyment of more leisure to extend the range of their acquisitions; more industry was then employed in the fabrication of clothes and dwellings, the ideas of property and barter became general, the unequal distribution of rank gave rise to virtuous or criminal emulation; but the necessity of seeking fresh pastures still condemned them to a wandering life, rendered them subservient to the course of the seasons, and as yet confined within narrow limits the circle of their improvement.

The multiplication of the human species, and the advancement of art and science have been carried to any great length only since the invention of agri-

culture, and the division of the soil into hereditary possessions. By means of agriculture the manual labour of a portion of society has been found adequate to the sustenance of the whole, and thus has sufficient leisure been left for other occupations to those not engaged in the cultivation of the soil. The hope of securing by industry a comfortable subsistence for himself and his posterity, has added a new spur to the emulation of man. The discovery of a circulating medium to represent property, by facilitating exchange, and rendering private fortunes more independent, and more susceptible of increase, has carried this emulation to the highest possible degree; but, by a necessary consequence, it has also carried to the highest degree the vices of effeminacy, and the fury of ambition.

In the successive stages of social development, the natural propensity to reduce every thing to general principles, and to trace the causes of the phenomena of nature has produced contemplative men, who have added new ideas to the general mass of intellect. Such men have, for the most part, in unenlightened ages, sought to convert their mental superiority into the means of domination over their fellow men, exaggerating their own merits, and disguising their ignorance by the propagation of superstition.

An evil, still more irremediable, is the abuse of physical power. Man, who at the present day can bid defiance to the attacks of other animals, yet constitutes the only species that is perpetually in a

state of mutual warfare. The hunting tribes dispute for their tracts of forest, and the wandering shepherds for their range of pasture. Both again make perpetual inroads upon the cultivators of the soil, to possess themselves of the fruits of agricultural labour without the trouble of industry. Even civilized nations, far from being satisfied with the blessings they enjoy, engage in warfare for the prerogatives of pride, or the monopoly of commerce. From this propensity to combat, results the necessity of governments for the direction of national wars, and the repression or regulation of private quarrels.

Circumstances, more or less favourable, have either retarded the progress of civilization, or accelerated its advancement in the different races of mankind.

Thus in both continents the frozen climates of the north, and the impenetrable forests of America are, as yet, inhabited only by wandering hordes of savages who subsist by fishing or the chase.

The immense sandy deserts, or vast tracts of morass that extend over central Asia, and great part of Africa, are covered with tribes of shepherds and innumerable herds and flocks. These semi-barbarous hordes have assembled, from time to time, at the call of some enthusiastic chief, and poured, like an inundation upon the civilized countries which surrounded them, and whose inhabitants the baneful influence of luxury had rendered less capable of resistance. Having established themselves there, and become effeminate in their turn, they remained in possession until some other warlike hordes arrived to subjugate

or expel them. This is the cause of that despotism, which, perpetually pressing upon the people, has invariably crushed all the efforts of industry and talent in the beautiful climates of Persia, of India, and of China.

Mild climates, soils abundantly supplied with moisture by the hand of nature, and rich in vegetable productions, are the true cradles of agriculture and civilization. When the position of countries thus happily circumstanced, shelters them against the irruptions of barbarian hordes, talent of every description is excited, and mutual emulation carries every art and science to a high pitch of perfection. Such were the advantages possessed by Greece and Italy in ancient days, and such are the happy privileges at the present moment of by far the largest portion of Europe.

There are, however, intrinsic and almost constitutional obstacles which appear to arrest the progress of certain races of mankind even in the very midst of circumstances the most favourable to improvement.

VARIETIES OF THE HUMAN SPECIES.

The indiscrimiate sexual intercourse among the human race, and the consequent production of an offspring capable of propagation, seem to prove mankind to be but a single species. There are, however, certain hereditary conformations which give rise to peculiar distinctions among them, and constitute what are denominated *varieties*.

MONGOLIAN.

CHINESE FUR-DEALER.

London Published by C.B. Whittaker March 1817

AFRICAN.

COROMANTEE LAD.

C. Hamilton Smith Esq.r del.

London Published by C.R. White, Nov.r March 1817.

Among these varieties there are three which particularly merit attention, in consequence of the marked difference existing between them. These are, 1, the fair, or Caucasian variety; 2, the yellow, or Mongolian; 3, the Negro, or Ethiopian.

The Caucasian, to which we ourselves belong, is chiefly distinguished by the beautiful form of the head, which approximates to a perfect oval. It is also remarkable for variations in the shade of the complexion, and colour of the hair. From this variety have sprung the most civilized nations, and such as have most generally exercised dominion over the rest of mankind.

The Mongolian variety is recognised by prominent cheek-bones, flat visage, narrow and oblique eyes, hair straight and black, scanty beard, and olive complexion. This race has formed mighty empires in China and Japan, and occasionally extended its conquests on this side of the Great Desert, but its civilization has long appeared stationary.

The negro race is confined to the south of Mount Atlas. Its characters are, black complexion, woolly hair, compressed cranium, and flattish nose. In the prominence of the lower part of the face, and the thickness of the lips, it manifestly approaches to the monkey tribe. The hordes of which this variety is composed have always remained in a state of complete barbarism.

The Caucasian variety derives its name from the group of mountains between the Caspian and the Black Sea, because tradition would seem to refer

the origin of the people of this race to that part of the world. Thence, as from a central point, the different branches of this variety shot forth like the radii of a circle, and even at the present day we find its peculiar characteristics in the highest perfection among the people in the neighbourhood of Caucasus, the Georgians and Circassians, who are considered the handsomest natives of the earth. The principal branches of this race may be distinguished by the analogies of language. The Syrian division directing its course southward, gave birth to the Assyrians, the Chaldeans, the untameable Arabs, destined to become for a period nearly masters of the world, the Phenicians, the Jews, and the Abyssynians, who were Arabian colonies, and the ancient Egyptians, who, all in probability, owe their origin to the same source. From this branch, always inclined to mysticism, have sprung those religions, the influence of which has proved the most widely extended and the most durable. Science and literature have flourished occasionally among these people, but always clothed in strange and mystic guise, and obscured by a highly figurative diction.

The Indian, German, and Pelasgic branch (for it is one and the same) is infinitely more extended than the preceding, and was subdivided at an earlier period. We may, notwithstanding, still recognis every numerous affinities between its four principal languages: these are the Sanscrit, at present the sacred language of the Hindoos, and parent of all the dialects of Hindostan; the ancient language of the Pelasgi, the common

mother of the Greek, the Latin, of many tongues now extinct, and of all those spoken in the south of Europe; the Gothic or Teutonic, from which the languages of the north and north-west of Europe are derived, the German, Dutch, English, Danish, Swedish, *&c.*; lastly, the Sclavonian, from which come the languages of the north-east of Europe, as the Russian, Polish, Bohemian, *&c.*

This extensive and powerful branch of the Caucasian race may be placed with justice in the foremost rank of the sons of men. The nations which compose it have carried philosophy, science, and the arts to the greatest perfection, and for more than thirty ages have been the guardians and depositaries of human knowledge.

Previously to its entrance, Europe had been occupied by the Celtic tribes, who came from the northward, and by the Cantabrians, who passed from Africa into Spain. The former, though once considerably extended, are confined at present to the most western extremities of Europe, and the latter are now nearly confounded among the numerous nations whose posterity are settled in the Spanish peninsula.

The origin of the ancient Persians is the same with that of the Indians, and their descendants at the present day bear the strongest marks of affinity with the European nations.

The Scythian or Tartarian branch, at first, extended towards the north and north-east of Asia. Accustomed to a vagabond and predatory life in

those immense tracts of country, these wandering tribes left them only for the purpose of devastating the inheritance, and subverting the establishments of their more fortunate brethren. The Scythians, who at so remote a period of antiquity, made irruptions into upper Asia; the Parthians, who there destroyed the dominion of the Greeks and Romans; the Turks, who overturned the Saracen empire in Asia, and subdued in Europe the unhappy remnant of the Grecian people,—all sprang from this mighty branch of the Caucasian race.

The Finlanders and the Hungarians are hordes of the same division, seemingly strayed as it were into the midst of the Sclavonian and Teutonic nations. The north and the east of the Caspian Sea are still inhabited by people of the same origin, and who speak similar languages, but intermixed with a variety of petty nations of different descent, and discordant tongues. The Tartar people have remained unmixed longer than the rest, in the region extending from the mouth of the Danube to the further branch of the Irtisch, where they so long proved formidable to the Russian empire, though at length subjected to its sway. The Mongoles, however, in their conquests have mingled their blood with these nations, and we discover many traces of this intermixture more especially among the natives of lesser Tartary.

To the east of this Tartar branch of the Caucasian race, the Mongolian variety begins to be discovered, from which boundary it extends to the eastern ocean. Its branches the Calmucks, *&c.*, are

still wandering shepherds perpetually traversing the great desert. Thrice did these nations, under Attila, under Gengis, and under Tamerlane, spread far and wide the terror of their name. The Chinese belong to this variety, and are thought to have been the most early civilized, not only of this race, but of all the nations of the world. The Japanese and the Coreans, and almost all the hordes which extend to the north-east of Siberia, under the dominion of Russia, are in a great measure to be ranked under this division of mankind. With the exception of a few Chinese literati, the Mongolian nations are universally addicted to the different sects of the superstition of Fo.

The origin of this mighty race seems to have been in the mountains of Altai, as that of ours was in the Caucasian. We cannot however trace the course and propagation of the branches of the one so well as those of the other. The history of these shepherd nations is as fugitive as their establishments. The records of the Chinese, confined to their own empire, throw but little light on the traditions of their neighbours; nor can the affinities of languages so little known lend much assistance to our researches, or direct our steps in this labyrinth of obscurity.

The languages of the north of the peninsula beyond the Ganges, and also that of Thibet, bear some resemblance to the Chinese, at least in their monosyllabic structure, and the people who speak them are not without traits of personal similarity to the other Mongole nations. But the south of this peninsula

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is inhabited by the Malays, a much handsomer people, whose race and language are spread over the sea-coast of all the islands of the Indian Archipelago, and through almost all the islands of the southern ocean. In the largest of the former, especially in the wild and uncultivated tracts, we find another race of men, with crisped hair, black complexion, negro countenance, and barbarous beyond measure. Those that are most known have received the name of Papuas, and it may be applied as a general denomination to them all.

It is not very easy to refer either the Malays, or the Papuas, to any one of the three grand varieties of mankind already described. It is a question however, whether the former people can be accurately distinguished from their neighbours on either side; the Caucasian Hindoos on the one, and the Mongolian Chinese on the other. We scarcely find in them characteristics sufficiently striking for this purpose. Again, are the Papuas Negroes, who, in remote periods, may have lost their way upon the Indian ocean? We have neither figures nor descriptions sufficiently clear to reply to this question.

The natives of the north of both continents, the Samoiëdes, the Laplanders, and the Esquimaux, spring, according to some authorities, from the Mongolian race. According to others, they are only degenerate off-shoots from the Scythian branch of the Caucasian variety.

The Americans themselves have not yet been properly referred to either of the other races, nor

have they characters precise and constant enough to constitute a fourth variety. Their copper coloured complexion is not sufficient. The lank black hair and scanty beard would seem to approximate them to the Mongoles, if their well-defined features, and prominent noses, did not oppose such a classification; their languages are likewise as innumerable as their tribes, and no mutual analogy has yet been ascertained between them, nor any affinity with the dialects of the ancient world.

SUPPLEMENTAL HISTORY OF MAN.

THUS far we have pursued the text, or have endeavoured, at least, to pursue the sense of the text, of Cuvier, taking notice, by marginal comments only, of such points of his doctrine and opinions as appear to have been perverted to the support of notions he neither entertains nor advocates—or of such as not being in accordance with our own opinions, we have ventured, with due deference, to point out as questionable, together with the grounds of doubt.

In pursuance of the proposed plan of this work it now becomes necessary to commence such additions to the "Régne animal," as may be in furtherance of the descriptions and illustrations of the species either partially noticed, or altogether omitted by our author: for, be it remembered, that his object was

to arrange and divide the animal kingdom in conformity with its organization, and not to describe the species which compose it further than was necessary to show the propriety of such arrangement.

Man, the immediate object of our consideration, offers a field of observation so difficult of limitation, that the whole of the following sheets, together with a great combination of various learning and talent, might well be employed on the subject. Necessarily brief, however, will be our observations, which must be confined to notices of some of the several minor varieties in person and mind which Cuvier has included in the three great divisions of Caucasian, Mongolian, and Ethiopian.

It will quickly be seen that it is necessary to notice but a few even of these, for the attempt to embrace all would be tedious, and the result would, most probably, be unsatisfactory. An Englishman, a Scotchman, an Irishman, a Welshman, nay, even the natives of different bordering counties generally offer some peculiarities of character sufficiently general and hereditary to admit of the application to them of the term varieties. Let us therefore advert to such of the national distinctions only as mark large portions of the human race known to most of us by books alone.

Previously, however, to entering further on the subject of the diversities of man, it is hoped that a few pages devoted to certain general points peculiar to him as a species, will not be without interest to

the general reader, however uninstructive they may be to the professed physiologist or metaphysician. We shall then advert shortly, first to those distinctions which separate mankind specificially from all other animals; and secondly, to such points of variety as distinguish men among themselves.

THE SPECIFIC DIFFERENCES BETWEEN MAN AND OTHER ANIMALS.

Peculiar character of the Head and Brain.

The first of these points which seems to call upon us for some attention here, as distinguishing man from all other animals, is the character of the human head and brain. That these parts of our material frame are intimately connected with our intellectual faculties cannot reasonably be doubted. It must not, however, be forgotton that connexion is one thing and identity another; and that the line between the mental faculties and cerebral organs is clearly drawn; that one is no more to be confounded with the other than the telescope with the eye, or the musical instrument with the performer.

As the head contains the organ of thought, and is also the seat of mere animal sensation, its peculiarities are worthy of the utmost attention. The proportion of its parts in the human subject indicate a predominance of the powers of thought over those of sense; for we find in man when compared with

other animals, a very striking difference in the relative proportions of the cranium and face, the latter of which is occupied by the organs of the external senses. In proportion to their development the comparative size of the face is increased while that of the cranium is diminished. This last on the other hand is augmented in proportion to the increased quantity of brain, and the face becomes diminished. Man is distinguished by the superior size of the cranium when compared with the face, above all other animals; and it will generally be found among the brute creation, that those beings which approximate most closely to these proportions in the human subject, also combine the largest portion of intelligence and docility.

One method of expressing numerically, or with some certainty these relative proportions, though perhaps not in all cases quite satisfactory, is by the course of the facial line, and the consequent number of degrees in the facial angle. Taking a view of the head in profile, when the body is in a perfectly erect position, a line drawn from the greatest projection of the forehead to that of the upper maxillary bone describes the direction of the face, and is called the *facial line;* a second line perfectly horizontal drawn backwards from beneath the basis of the nostrils, forms with the other what is termed the facial angle, and gives the measure of the relative prominence of the jaws and forehead. In man alone the facial line is perpendicular, for in him alone is the face situated perpendicularly be-

neath the cranium; the consequence of this is, that in the human subject the facial angle is, or approaches nearer than in any other, to a right angle. In brutes, on the contrary, as the face is placed in front of the cranium the facial line is oblique, and the facial angle acute. This obliquity of the line and acuteness of the angle increase more and more as we descend in the scale of animated beings, until at last the angle is entirely lost, the cranium and face become completely on a level, and form parts of one horizontal line.

The idea of stupidity has been generally associated with the elongation of the snout, or lower part of the face, which necessarily increases the obliquity of the facial line, and the acuteness of the facial angle.

The elevation of the facial line, on the contrary, both in men and brutes, from what cause soever, produces an air of intelligence, and the attributes of superior sagacity: the reason of which is, that in man, and the quadrumanous animals, where the frontal sinuses are inconsiderable, this elevation is caused for the most part by the convexity of the brain and capacity of the cranium.

But it must not be forgotten that in many other animals the facial line does not measure the prominence of the brain, but that of the frontal sinuses, which, in the carnivora, many of the ruminantia, and especially in the elephant are so large as to raise the facial line to a very considerable degree. The practical application of this measure-

ment, therefore, is of much less accuracy, extent, and importance than its inventor Professor Camper seems to have imagined. It affords a striking general view of the great characteristic difference between man and some other animals, but beyond this its utility is more than questionable.

It is evident that the ancient Greeks understood this theory of the facial line and angle, as appears by the valuable remains of the sculpture of this extraordinary people. In their representations of legislators, sages, and poets, upon whom they wished to bestow an august character, they have extended the facial angle to 90°; but they have increased these dimensions still more in their statues of heroes and gods, pushing the facial line even beyond the perpendicular, and making the angle 100°.

In the human subject the facial angle varies from 65° to 85° in adults; in children it reaches to 90°, a sufficient proof perhaps, if we had no other of its inadequacy as a standard for the measurement of intellect. The first extreme of these proportions forms a near approximation to the monkey race, many of which have, in fact, as good a facial line as the generality of the negroes. Beyond the second, it has been extended in the beau ideal of the Greeks; 100°, however, appear to be the "*ne plus ultra.*" According to Camper this measurement constitutes the most beautiful countenance, if indeed, proportions which, by his own confession, never yet existed in nature, can, with any propriety, be

supposed to constitute beauty in any reasonable acceptation of the word. We quote his own language on this subject:—"It is certain that no such head was ever met with; and I cannot conceive any such should have occurred among the Greeks, since neither the Egyptians, from whom they probably descended, nor the Persians, nor the Greeks themselves, ever exhibit such a formation on their medals, when they are representing the portrait of any real character. Hence the ancient model of beauty does not exist in nature, but is a thing of imaginary creation; it is what Winkelman calls '*beau ideal.*'"

The truth appears to be, that every nation forms its ideas of beauty from that conformation which is peculiar to itself. An ample facial angle was characteristic of the Grecian countenance, and this they exaggerated in their representations of superior natures. It may be questioned, however, whether they meant to designate, by the immense forehead, the perfection of intellect or that of corporeal beauty.

Another method of shewing the proportions of the cranium and face is, by making a vertical section of the head. But a view of these proportions in man and brutes will prove that no conclusions relative to intellectual powers can be drawn from them. The area of the section of the cranium in man is nearly four times as large as that of the face; in the orang-outang it is three times; twice in the small prehensile-tailed monkeys; and nearly equal in baboons and carnivorous animals, excepting the

short muzzled dogs, where the cranium is a little longer than the face. In the hare and marmot the face exceeds the cranium by one third; in the porcupine and ruminating animals, by a half; and still more in the pig kind: it is three times as large as the cranium in the hippopotamus, and four times in the horse. Now it is obvious that these proportions, if attended to as indicative of intellectual superiority, would lead us to conclusions utterly at variance with facts. That noble animal the horse, so conspicuous for docility and intelligence, would be inferior to the hare, and the marmot, the pig, and the porcupine; and the Newfoundland dog, so famed for sagacity, courage, and attachment, would be on a level with the most ferocious of the carnivora, and the most brutal of the monkeys.

The human face, indeed, infinitely more than the configuration of the head, and the uses to which the individual parts of the face are subservient, present a most striking contrast between man and the brute creation, and furnish the most decisive indications of his measureless superiority. In the latter, the organs of the face are merely instruments for the procuring and preparing of food, or they are offensive and defensive weapons. In the former, they form the medium of mental expression, and indicate, by a silent but most expressive and universal language, the feelings, motion, and operations of the intelligent and immortal spirit that resides within him. The face, or rather muzzle of the brute is principally composed

of elongated and narrow jaws. The chin, lips, cheeks, eyebrows, and forehead, are either nearly wanting, or exceedingly reduced. The nose is nearly confounded with the upper jaw, or, if more developed, is connected only with the mere animal office. But in man the jaws and teeth are considerably diminished in relative size, and hidden from the view: the mouth is very small, and incapable of being employed directly and unassistedly in taking food; but the other parts of the face, the chin, lips, eyelids, eyebrows, &c., are developed to an extent and receive a freedom of action not to be found in other animals. The ample and lofty forehead surmounting his other features, completes the picture of a moral and intellectual being. The motions of this finely-formed countenance, "the human face divine," correspond with the feelings and emotions of the soul within, and form an important medium of communication between man and man. The human countenance in form and expression presents the most complete contrast to that of brutes of every class, the anthropomorphous tribes not excepted.

Camper has assigned the want of the intermaxillary bone as one of the characteristics which distinguish the human head from that of other animals. The upper maxillary bones of the human subject are joined together, and contain all the upper teeth. In other animals of the same class as man they are separated by a third bone shaped like a ridge, which, as it contains the incisor teeth, was called os incisivum. As this bone, however, is found in

animals which have no incisor teeth, and sometimes indeed where there are no teeth at all, Blumenbach has given it the more appropriate appellation of os intermaxillare. Man possesses nothing whatsoever analogous to this intermaxillary bone of brutes, but it is not perhaps yet clearly ascertained that all animals do possess it.

The head of man is further distinguished from other animals by having his teeth, at least when adult, all about the same length, and in an uniform series. Among the brutes, the teeth differ considerably in shape, make, size, and length, in the different genera, and are separated by interstices more or less wide. The canine teeth not being separated from, or surpassing in length the others, is a a strong peculiarity in the human structure.

The lower incisors in man are perpendicular, and are in a vertical line with the front of the jaw. In brutes these teeth slope backwards directly from their alveoli; the jaw also has the same inclination, so that the chin, so remarkable a feature in the human face, is found in no other animal, not even in the orang outang.

The obtuse tubercles of the cheek teeth are also very remarkable. They neither resemble the corresponding teeth in herbivorous nor in carnivorous animals, but are well adapted to the mixed mode of diet natural to man.

Having thus briefly touched upon those points of conformation peculiar to the human head, or which have engaged the attention of physiologists, and

excited the surmises of speculative men, it remains to advert to those peculiarities which separate man from the rest of the animal creation in regard to the brain.

The immense superiority of man over other animals in mental facultics, has naturally led us to look for some corresponding peculiarities in the human brain, which we know to be the seat of all the senses, and have every reason to suppose to be the instrument or organ of thought and reflection.

The grand endowment of the human mind, the original quality which seems to distinguish it from its first being embodied in a material frame, is capability. Man as we see him around us morally speaking is the creature of art and education, his susceptibility is brought into action, and he becomes elevated, as it were above the earth; but as we read of him in his natural state, or even in the partially cultivated condition of pastoral life, he displays powers of mind but little superior to his canine companion. Knowledge then is not indigenous in his mind: it is an exotic acquired by art, and approaches more or less to perfection, in proportion to the care and industry employed in its cultivation.

But, it may be said, and truly so, that the soil varies in the different races of mankind, and even in different individuals of the same race. Naturally steril in some it will defy or partially frustrate the utmost labour bestowed upon it, while its

natural luxuriance in others will, in a great measure, supersede the necessity of much cultivation.

There are then two points which seem more particularly to demand the attention of the physiologist in examining this wonderful organ, which connects the visible with the invisible world—the material with the immaterial creation. 1. Can we demonstrate in any of the appearances exhibited by the human brain, an adequate material cause to account for that capability and power of education, by which the human mind is so distinguished from that of all other animals; and, 2. Can the differences which distinguish men among themselves, in regard to mental powers, be attributed to any variety of conformation observable in the brain of each individual.

These points are in some measure still *in limine*, and it is not our province to pronounce a judgment upon them, but lest we should be thought to deny our creed by shrinking from the profession of it, we shall not hesitate to express our opinion, that the result of the endeavours to account for this measureless superiority of the human mind over that of all other animals by means of the brain, is a total failure; for although there are certainly some peculiarities in the brain of man, which distinguish it from that of brutes, still nothing material has been discovered, as far as we can reasonably suppose, at all adequate to produce the superiority in question. And further, that materialism makes no amends for its preposterous absurdity, but plunges us in greater

difficulties in accounting for the phenomena of mind. Organism, however, at least when limited to a sort of *modus operandi*, by the Creator, on the immaterial intellect, *may* eventually be shown to have some general operation and influence in accounting for those differences obvious to all between man and man. This position, however, we conceive to be by no means established, and to be pushed by its supporters far beyond its probable legitimate limits.

Let us however without further speculation proceed to consider the facts discovered, and observations made by men of science on the brain, as applicable to the division of the subject now under consideration, namely, the specific differences between man and other animals.

The ancients asserted that the brain of man is absolutely larger than that of any other animal, and there is probably no other exception to this rule than in the elephant, and perhaps some of the larger cetacea. All the larger animals with which we are more intimately acquainted, have absolutely smaller brains than man, as may be demonstrated by a comparison of crania.

Another method has been tried by later naturalists in the investigation of this subject; they have compared the proportion which the mass of the brain bears to the entire body in men and brutes. This comparison not being at first extended beyond the domestic and more common animals with which we are acquainted led to the proposition, that man,

in proportion to the size of his body, has the largest brain of all the living tribes; but as this comparative view came to be extended to a greater number of animals, many exceptions were discovered. Several mammalia, and even some small birds were found to exceed man in these proportions.

These discoveries having entirely overturned the conclusion drawn from the bulk of the brain compared with that of the body, Soemmering has furnished us with another method, and one which appears *primâ facie* to approach much nearer to the attainment of truth. His plan is to consider the relative magnitude of the brain and the medulla spinalis, or in general of the mass of the brain, and the nerves arising from it. For this purpose the brain must be divided into two sections, the one comprehending that part immediately connected with the sensorial extremities of the nerves, and thus devoted, strictly speaking, to mere animal purposes; the other, including the remainder of the brain, which is supposed to be the seat of the intellectual operations.

In this point of view, man appears to possess advantages over the lower animals; none being found to possess so large a brain, in comparison with the bulk of the nerves, which issue from it. The species which approach the nearest to man in sagacity possess a larger share of this superabundant brain, which remains after subtracting the quantity deemed necessary, for the supply of the nervous system.

But to give a more perfect idea of this subject, we quote a passage from this celebrated anatomist.

"All the simiæ, in this respect, come after man; for although the proportion of their brain to the body, particularly in the small species with prehensile tails, is equal to that of man, their very large ears, eyes, tongue, and jaws, require a much larger mass of brain, than the corresponding parts in the human subject; and, if you remove this, the ratio of the brain to the body, is much diminished.

"Animals of various kinds, seem to me to possess a larger or smaller quantity of this superabundant portion of brain according to the degree of their sagacity and docility. The largest brain of a horse which I possess, weighs one pound seven ounces; the smallest human brain that I have met with in an adult, two pounds five ounces and a quarter. But the nerves in the basis of the horse's brain are ten times larger, than in the former instance, although it weighs less by fourteen ounces and a quarter.

"But we are not hastily to conclude that the human species have smaller nerves than any other animals. That my ideas may be better understood, I will state the following imaginary case. Suppose the ball of the eye to require 600 nervous fibrils in one instance, and in another half the size 300; further, that the animal with 600 fibrils possesses a brain weighing seven drams, and that with 300 a brain of only five drams. To the latter we ought to ascribe the larger brain, and a more ample capacity

of registering the impressions made upon the organs of vision. For allowing one dram of encephalon to 100 fibrils, the brain which is absolutely the least, will have an overplus of two drams, while the larger has only one.

"That the eye which is supplied with a double number of fibrils may be a more perfect organ of sense will be readily admitted; but that point is not connected with the present question."

It is clearly evident, we repeat, that no satisfactory information has yet been afforded respecting the diversities of intellect between man and the brutes, by these ingenious and industrious researches; and we greatly fear that the present barrier of ignorance and indecision on the precise nature of the connexion between brain and mind is very likely to continue insurmountable.

It is obvious that the position advanced by Soemmering rests altogether on a mere assumption. He supposes that a certain proportion of brain is requisite to enable a certain portion of nerve to perform its office. Now this is very far indeed from being self-evident, and we want the means of giving it sufficient support. The comparison of the nerves and brain, in a general point of view, is by no means satisfactory. It would be necessary to ascertain the relative proportions of the cerebrum, cerebellum, and medulla oblongata. With the last, most of the nerves are more intimately connected, and to ascertain its relative magnitude in particular would be an important point. Few of the nerves are connected

with the cerebrum, and none immediately with that part which is properly called the cerebellum.

It is asserted that the magnitude of the cerebral hemispheres in the human subject far exceeds that of the same parts in any other of the mammalia, whatever may be the proportion between the entire encephalon and the rest of the body.

Another characteristic of the human brain is that the number of its parts is greater, and the development of each more complete than in any other animal. No individual part is found wanting in man which is possessed by any other, while many are deficient in several of those parts possessed by men, or have them very much reduced in magnitude. An assertion has, in consequence of this fact, been made that it would be possible by diminishing or changing proportions to form the brain of any animal out of the materials of the human; but that the converse of this proposition is not true.

The human brain also approaches nearer than any other to the figure of a sphere. We have already noticed the fact of the smallness of the nerves in proportion to the brain, and of the decrease of the latter and increase of the former as we descend from man in the scale of life. We may now add that in the fœtus, and in the child, the nerves are of a magnitude proportionally greater than in the adult subject.

That man has the largest cerebrum in proportion to the cerebellum is not quite so certain as that he has the largest cerebrum in proportion to the

medulla oblongata, and spinalis. To this, however, one striking exception is to be found in the dolphin, which seems to overturn any hypothesis built upon these proportions.

The deepest and most numerous convolutions characterize the brain of man. This is apparently in consequence of its size, and intended to afford a more extensive surface for that vascular membrane, the pia mater.

As the brain of animals diminishes in size these convolutions become shallower and fewer in number; and in many animals do not exist at all.

The greatest quantity of medullary substance in proportion to the cortical belongs to the human brain, and this proportion of medulla is much greater in the adult than in the fœtus.

According to Soemmering the acervulus pinealis, or pineal gland, constructed of a sandy or earthy material, is peculiar to the healthy state of the human brain, being found there from the fourteenth year. It may be considered as almost confined to man, but one instance has been recorded by himself, and another by Malacarne of its occurrence in the fallow deer and the goat. Its deficiency in the brain of the human subject is considered by Blumenbach as a very singular irregularity of structure: but the Wenzels have ascertained that this deficiency is not so uncommon as had been represented, and also that the fourteenth year is not invariably the earliest date of its appearance.

Considerable changes take place in the human

brain after birth, in its entire mass, in its relative proportions, and in its general texture. Some have asserted that the progress of the intellectual faculties corresponds with these alterations, an assertion, however, which requires more complete proof than has yet been adduced to support it, and which cannot always be reconciled with our experience of the individual variations as to time in the changes and development of human intellect.

It is disputed at what period of life the human brain arrives at complete development. Some assigning three years of age as the limit of its increase, others seven, and others a much later period. It is not improbable that the animal is perfect in its organization soon after birth; this, if true, would constitute a remarkable point of distinction between man and the lower animals.

We shall conclude our observations on the brain in the language of Mr. Abernethy, who, in reference to the diversities of intellect and mental impulse, which both collectively and individually mark mankind, is too enlightened a philosopher to confound mind with matter, or to suppose that the subtilty of thought can ever cease to evade the knife of the anatomist. His practical deductions are of real utility and importance.

"To me the plurality of our senses has always appeared a strong argument for the individuality of mind. *I* see, *I* hear; *I* am variously affected. I am more delighted with the objects I behold, or more charmed with the melody I hear.

"If we are told that in consequence of certain conformations of our brains, we have propensities productive of good or evil, according to the degree or direction in which they are exerted, it is but attempting to account for facts, of which we are all conscious. Men are, by nature, brave or fearful, generous or covetous, candid or cunning, fickle or determined; and these original qualities, although they admit of being controlled and suppressed, cannot be altogether annulled.

"There is nothing in these assertions contradictory to the result of general observation and experience. It is admitted that the superior intellectual faculties can and ought to control the inferior propensities. It is admitted that we may possess organs which nevertheless may be inactive from natural torpor or want of education. General observation and experience proclaim that susceptibility is the chief incentive to action, that it is the source of genius, and that the character of man greatly depends upon his education and habits. We educate our faculties, and, it is evident, that of whatever materials Nature may have made us, she has, at least, given us great powers of forming and fashioning ourselves. Had the dispositions and powers of our minds been similar, human life would have been dull and monotonous. Their varieties enable us by education to attain different kinds and degrees of excellence, and to be useful to one another.

"If the peculiarities of our feelings and faculties

be the effect of variety of excitement transmitted through a diversity of organization, it should tend to produce in us mutual forbearance and toleration. We should perceive how nearly impossible it is that persons should think and feel exactly alike upon any subject. We should not arrogantly pride ourselves on our virtues and knowledge, nor condemn the errors and weakness of others, since they may depend upon causes which we can neither produce nor readily counteract. No one, judging from his own feelings and powers, can be aware of the kind or degree of temptation or terror, or the seeming incapacity to resist them, which may induce others to deviate."

The general extension of Mankind over the surface of the Globe.

In considering these interesting peculiarities which distinguish man from the brute creation, the next in order worthy of notice seems to be his capability of inhabiting every climate. The strength and flexibility of his frame enable him to subsist in every variety of temperature, while his ingenuity can devise the means of support from the most ungrateful soils. We find him in the high latitudes of the polar regions, and beneath the burning line; on the lofty mountain; in the deep valley; the dank morass; and the sandy desert. Cold and heat; drought and moisture, and every atmospheric variety are alike to him. He may be said to be

endowed with terrestrial ubiquity. He thrives everywhere, and climate is less influential in the production of varieties in his species than in every other. The tendency to variation from diversity of abode is much more conspicuous in the inferior animal creation. This is a characteristic mark of specific distinction too remarkable to be passed over by the natural historian of man.

The Greenlanders and Esquimaux are found as far as between 70° and 80° north-latitude, and the Danes have formed settlements in Greenland in as high a degree. Dr. Aikin notices the fact of three Russians having lived between six and seven years in Spitzbergen, between 77° and 78° north-latitude. The capacity of the human species to endure cold, has been still further illustrated by the late enterprising voyages to the Arctic Regions. While the mercury has been frozen in the ball of the thermometer, and in the open air, while many of the animals who seem apparently born for these inhospitable climates, proved incapable of enduring the intensity of the cold, the enterprising and philosophic travellers, Parry, Franklin, and their companions, have lately braved all the rigours of a worse than Siberian winter, and the hardy native disdained to confine himself to his habitation.

In a temperature where brandy is frozen even in rooms, the Indian of Canada, and the Esquimaux proceed with impunity to the chase; and even the European, if he keep his blood in circulation by sufficient exercise, can bear without detriment a

similar severity of cold. The Danes have lived in 72° north-latitude in Greenland; and the Dutch under Heemskirk wintered at Nova Zembla, in 76° north-latitude.

On the other hand the capacity of man to endure intense heat is not less remarkable than his power of sustaining cold. Notwithstanding the assertion of Boerhaave, that a temperature from 96° to 100°, would be fatal to the human species, yet the mean temperature of Sierra Leone is 84° of Fahrenheit, and at some distance from the coast, the thermometer has been seen at 100°, and even 102° and 103° in the shade, as we read in Winterbottom's account of the native Africans. Adanson reports its being at 108½° in the shade at Senegal in 17° north-latitude. Buffon mentions a case of its having reached to 117½°. It is probable that the country, to the west of the great desert, is still hotter than Senegal, from its being exposed to the action of the burning winds that have blown across its surface. In Sicily the thermometer rises to 112° at times. In South Carolina it has been seen at 115° in the shade, and Humboldt saw it at 110° to 115° in the immense Llanos near the river Oroonoco.

Thus it appears that man can sustain all the degrees of heat and cold felt in this planet. Nor is his capacity less for supporting the varieties of atmospheric pressure. We reckon that at the level of the sea the average pressure of the at-

mosphere is 32,325lbs., upon the whole surface of the body, calculated by the barometer at 30 inches. On ascending to a height of 12,000 feet, the barometer stands at 20½ inches, and the pressure is reduced to 21,750lbs. At this elevation there are immense tracts of land in South America, well stocked with inhabitants. Condamine and Bouguer lived for three weeks with their attendants as high as 14,604 French feet above the level of the sea, where the barometer stood at 15 inches 9 lines, and the pressure was only 16,920lbs. There are extensive plains in the Peruvian territory at an elevation of 9000 feet, and the interior provinces of Mexico, containing half a million of square miles, present a level altitude of between 6000 and 8000 feet. The city of Mexico is 7475 feet above the level of the sea, and that of Quito 9550. The highest inhabited spot on the surface of our globe is said to be the hamlet of Antisana, 13,500 feet above the level of the sea, and Humboldt ascended Chimboraco to the height of 19,300 feet*. We never find men living under a greater degree of pressure than that first mentioned, the depth to which mining has been extended not much affecting this question. In diving, indeed, a considerable increase of pressure may be borne; as, on the other hand, those who have ascended in balloons beyond any point of elevations on the surface of the earth, have consequently experienced a

* One of the Himalayan peaks is much higher.

reduction of pressure much more considerable than any above stated.

This capacity of subsisting and increasing in every latitude, and under every variety of local influence, so curious a phenomenon in the natural history of man, seems partly attributable to his physical constitution, and partly to his mental powers. The original source of this very peculiar privilege, is certainly to be found in the properties of the human frame, but the fullest extent to which it is attainable must undoubtedly be referred to the intellectual superiority of man.

That custom is a second nature in man, is a very trite and a very true observation. Its influence over him is greater than over brutes. But though man is thus the creature, he is very far from being the slave, of custom. There are few, if any, of his habits that he cannot alter or forego with perfect safety, provided he observe a due precaution in the change. His capacity of physical endurance may be increased to a wonderful extent by practice, and that even at a comparatively advanced age. The influence of custom, in this respect, on the body bears a close and striking analogy to that of education on the mind; just as the corporeal capacity, now under consideration, does to that indefinite faculty of intellectual improvement which constitutes the highest privilege, and most glorious distinction of man above every other living being.

Art, unquestionably, does much to enable man to endure the vicissitudes of climate, and the most

opposite varieties of temperature: but it does not, nor cannot do all. Were it not for the strength and flexibility of his corporeal frame, we should not find his race so diffusively extended over the surface of the whole earth. The majority of the savage nations, who inhabit cold countries, are not very fastidious in protecting their bodies against the severity of winter. The Indian of Canada will proceed fearlessly to the chase in the depth of frost and snow with open breast and uncovered limbs. Nay, he will sleep upon the snow, and has been known to do so with impunity, when the thermometer at sunrise was 40° below 0. The young Greenlander from his birth is accustomed to dabble in the water, till he becomes almost an amphibious animal. On the other hand, the natives of the torrid zone employ still less precaution against the heat, than the northern savage does against the cold. Bare-headed the negro braves unhurt the vertical sun, and bare-footed treads upon the burning sands. Even the women and children on the coast of Sierra Leone have their heads uncovered both in rain and sunshine.

The physical capacity which goes so far to assimilate man to his habitation, be it where it may, is assisted wonderfully by that mental superiority which constitutes him lord of this sublunary creation. This it is which effectually fences him against the rigours of winter, and screens him from the torrid sun, which supplies him with the means of artificial heat, and empowers him, as it were, to create

a climate of his own in every degree of latitude. The arts of human ingenuity furnish a protection against the endemic peculiarities of every region. Thus we see the same nation pass with impunity into all the countries of the world; winter near the pole, and colonize beneath the tropics; drain the pestilential marsh, and clear the boundless forest; build, like the eagle, on the lofty mountain, and burrow in the lowly valley, deriving, by its ingenuity and industry, the means of subsistence, of luxury, and of splendour, from the steril rock, and the howling wilderness.

It is when we contrast this universal extension of man over the earth, with the narrow limits assigned to other animals, that this his privilege becomes the most apparent. The Simiæ are, for the most part, confined within the tropics, and, even within these boundaries, the range of each particular species is far from considerable. The American varieties and those of the old world are different from each other. It is in vain to particularize any, when all species are thus exclusively located. Exceptions, indeed, might be named in a few found more extensively spread than others, but none of these are found in both the new and old world. Transported from their native seats, the individuals of the anthropomorphous tribes, soon lose their strength and vivacity, rapidly degenerate, pine away, and die. With the most careful management their existence can scarcely be secured for a time even in our latitude, and their power of propagation ge-

nerally speaking, and with a very few exceptions, is at an end.

In like manner other animals, naturally formed for cold countries, such as the polar bear, cannot subsist in hotter climates. The dog, man's old and constant companion, in spite of all the aid his master can afford him, runs into considerable varieties, and degenerates materially when exposed to the operations of very opposite extremities of temperature.

On the Food of Man.

As the physical capacity and mental powers of man enable him to occupy the whole surface of the globe, it follows that he cannot be restricted to any one particular kind of food; in other words, man must be naturally omnivorous, as a necessary consequence of his ubiquity.

If the wastes of Lapland, the shores of the Icy sea, the frozen coasts of Greenland, and the deserts of Terra del Fuego, were destined by nature for the habitation of man, then is man not an herbivorous animal, nor is even a mixed diet necessary for his support. It would be impossible to procure any vegetable productions, where the surface of the earth is so long covered with deep snow, or rendered impenetrable by frost. The continual use of animal food is as natural and wholesome to the Esquimaux, as a mixed diet to the Englishman. The Russians, who winter on Nova Zembla, must, to preserve their health, imitate the Samoidees—eating

raw flesh, and drinking the blood of the rein-deer. Such is the diet, Dr. Aikin informs us, necessary for health in these northern regions. The Greenlander dines with a good appetite on raw whale, or on the half frozen and half putrid flesh of seals, which have been buried beneath the grass in summer, or the snow in winter. These people drink the blood of the same animal; and another of their dainties, is a dried herring soused in whale-oil.

In the torrid zone, it is difficult to support the flocks and herds necessary for the subsistence of the inhabitants in animal food; periodic rains and inundations, and the long continued influence of a burning sun, prevent the requisite supply of pasture; but the support of the natives is well provided for by the munificence of nature in another way. By her magnificent presents of the cocoa-nut, the plantain, the Sago tree, and the Banana; by the yam, cassava, and other roots; by a variety of refreshing fruits; and, more particularly, by the very abundant production of nutritious grains. Here is an abundant supply of the most suitable nourishment, and accordingly we find vegetable diet the most prevalent and the most wholesome, in the torrid regions. The general and necessary adoption of a vegetable diet within the tropics, from the greater abundance and exuberance of the vegetable creation, and the comparative scarcity of those gregarious animals on which man chiefly subsists in the temperate regions of the earth, appears to be a provision of nature necessary to the existence of

the human species in the higher ranges of temperature. The adoption of an animal diet exclusively, or of too large a proportion of this species of food, disposes the human frame, when exposed to the influence of a tropical heat, to those diseases which arise from endemic sources—from the decay of vegetable matters, the exhalations of marshy and absorbent soils, and the accumulated emanations in moist and close situations. And not only does this class of diseases prey more exclusively and fatally on those who, in warm climates, indulge in a full animal diet, but those maladies, also, which occur under epidemic forms; assuming the characters of wide-spreading pestilences, produce their greatest havoc amongst those who, to the predisposition occasioned by a high range of temperature, have superadded that, resulting from the adoption of animal diet. It appears to be a salutary law of nature, that, in those particular climates and countries, wherein the too frequent use of animal food would be detrimental to the human race, there, those animals usually destined for this purpose are few in number, and stunted in growth. The same climates and situations, indeed, which are productive of the most destructive diseases, are also inimical to those classes of animals which, being chosen as a chief article of food, would both dispose to these diseases, and increase their fatality. Thus it appears, that the distribution of the lower classes of animals over the surface of the globe is so proportioned, and certain of their genera and species so restricted

to particular latitudes, as to be subservient to the wants of man, without becoming hurtful, or endangering his existence in climates which are, in some respects, unpropitious to his mental and bodily development. Indeed, the causes which influence, and the laws which regulate the distribution of animal and vegetable productions over the earth's surface, often conduce more materially to the existence of the human species in every climate and country, and to the perfection of its physical and intellectual capacities under various circumstances inimical to both, than the natural operation of food itself.

The intimate relation which exists between the food of man, and the nature of the soil and climate which he inhabits, has seldom been considered in a manner which the subject deserves. Man, although in some measure independent of the nature of the soil or climate in which he lives, is yet, in several points of view, the creature of both. His manifestations, whether moral or physical, are moulded by both influences, like the animals which are below him in the scale of creation, although frequently in a much less degree. It is the soil which furnishes his food, and the air which he respires derives whatever is noxious to his system from the same source; whenever, therefore, the natural history of man comes to be considered, it should be viewed in relation to those productions of the soil on which he subsists, and with which, in many respects, he may be considered as a fellow-product, but holding a superior relation. As it is beyond the scope of this work to

enter fully into the many interesting considerations which this subject involves, we can only point to its more general connexions; and we do this more with a view to direct that share of attention to it which it deserves, than even to attempt to satisfy our own wishes as to the mode of its consideration.

Within the tropics, man is subjected to the almost continual operation of a high temperature, which tends greatly to excite the nervous functions and the vascular activity, notwithstanding the provision with which nature has furnished the integuments which cover his body, in order to moderate the excessive heat to which he is liable. This provision consists chiefly of the dark colour of the rete mucosum, which speedily gives off the superfluous heat of the body, and the great activity of the perspiratory functions, peculiarities which characterize the skin of the races of mankind inhabiting intertropical countries. These countries, and more particularly such of them as are low and swampy, while they abound with the production of the vegetable kingdom, maintain very few of those gregarious animals which serve as articles of food: thus we perceive, that their inhabitants, unless in very elevated and cool situations, as in Abyssinia, Mexico, *&c.*; are obliged, by the scarcity of those animals, to subsist on the vegetable productions of the soil, and to adopt a system of religion which, while it tends to prevent the entire destruction of the more useful species, is sufficient to restrain their numbers within their appropriate means of subsistence, without encroaching on or impairing those resources with

which the vegetable creation furnishes man. Thus, in many places of intertropical Africa, the lower animals, whose numbers are few, are occasionally made sacred by the priests for a time; in other places, especially on the western coast of this continent, the use of animal food is seldom enjoyed, unless occasionally that which is derived from those prohibited species. In Hindostan, the natives are debarred from the use of animal food, and the cow is made sacred, evidently to prevent the destruction of a species whose milk furnishes man with one of the chief articles of diet. But those religious precautions are not only requisite, with a view of preventing the destruction of a species subservent to the existence of man, they are also necessary to his own health; and the very scarcity, or even the entire absence, of all animal food, is requisite to secure the inhabitants from being entirely swept away by the endemic and epidemic diseases to which those intertropical countries are particularly subject, and which the use of animal food would inevitably aggravate.

The grain, the roots, and the fruit on which the natives of these climates subsist, are better suited than any other kind of food, to nourish the body without exciting it; and while the kind of vegetable diet, which the hottest and most unhealthy climates furnish, tends the least to excite the nervous and sanguiferous systems, it promotes strength and endurance, while the hot spices, which are produced in the same situations, serve to preserve the animal body against the septic tendencies and the

miasmal sources of disease with which those countries abound. In both the Indies, and in intertropical Africa, the natives of low and moist situations live almost entirely on rice and maize; with these they consume as a condiment, a very large proportion of the hot spices, which are so abundant in these countries, and use them in all their diseases; the tonic and stimulating qualities of these spices are beneficial in preserving the human frame from the noxious effects of the rainy seasons, and from the invasion of worms and the various parasitic animals which prey on man. To these species even the feathered race, and many other animals resort, especially during the more unhealthy seasons to which those climates are subject.

Were the natives of these countries, constituted as they are, to addict themselves to the use of animal food more than they do, vascular plethora would be the result, the nervous and vascular system would be more generally and more highly excited, the irritability would become much sooner exhausted, and the predisposed frame would be more subject to, and fall sooner beneath, the diseases which belong to those climates. It is in consequence of the adoption of too full an animal diet, that Europeans, in the low, moist, and hot situations, between the tropics, fall so soon the victims of disease. Nature adapts her productions, in every climate, to the necessities of man, and she even restricts the exuberance of these productions to his real but not to his imagined wants; and in no climate does this

provision appear more manifest than between the tropics. There, if the sources of disease be abundant, as they most indisputably are, she has chiefly restricted them to those which proceed directly from the soil and the climate, while she has confined those arising from the food provided for man's subsistence within narrow limits, as there he is destined by the circumstances already alluded to, to live on a vegetable diet. But even the inflictions which nature thus imposes on the inhabitants of those countries are accompanied by abundant means of preventing their invasion or arresting their progress. The most unhealthy situations not only abound with the most suitable sources of subsistence, but also present the most efficacious means of preventing and of curing the diseases they excite. Thus, rice, the banana, the plantain, the juice of the cocoa-nut, and of the palm, and the oil of the the palm-nut are the most wholesome articles of food in those districts wherein they most abound. The low grounds on which these are produced are fertile in marsh miasms, and the stagnant water, which there serves for the necessities of life, abounds with the ova of insects, and with animalcula, and while the one produces ague the other gives rise to diseases of the digestive canal and to the generation of worms, while both causes combine to produce fever, dysentery, cholera morbus, *&c.*; but these evils have their attendant remedies. On the borders of the rice grounds grow the different species of capsicums, which form the natural and almost only con-

diment employed by the natives of these countries, and which constitutes their chief prophylactic, and one of their most energetic remedies against the disorder just named, By the side of the palms and cocoa-tree grow the different species of the tamarind, and the croton, and constitute the mildest and the most drastic purgatives usually employed. Thus provided with an abundance of the vegetable food which such situations afford, and which is the most suitable to his condition, man is enabled to exist without suffering an undue proportion of disease, whereas the adoption of an animal diet, while thus circumstanced, would be soon followed by his own destruction.

In countries approaching the poles, where the low temperature generally prevailing, tends to depress the nervous sensibility, and the vascular activity, and to lower, in an eminent degree, the whole circle of vital action; we perceive that nature has furnished man with those articles of food, which are the best calculated to stimulate and to nourish the system, and thus to enable it to bear up against the rigorous seasons to which it is exposed. The articles of animal food already noticed as being most abundant, in hyperborean regions, are thus the most appropriate to the wants of the inhabitants. Indeed, without food of this description they would soon sink under those diseases of debility, which the depressing influence of cold induces, and the higher latitudes would consequently soon become destitute of the human race.

Temperate countries furnish the greatest abundance of both species of food, and thus enable the inhabitants to combine both, or to adopt more or less of either, according to the nature of the seasons, the condition of climate, and the particular circumstances in which they may be placed. Nature is always provident; she takes sufficient care that each particular district, country, and climate, shall have within themselves, or shall be capable of producing by requisite labour, those articles of diet which are most wholesome, and therefore most appropriate to their inhabitants. The diseases, to which particular situations are most liable, are generally more successfully avoided, or their fatality prevented by adopting as articles of food those productions only which the place affords. As commerce or manufactures increase the population of a district beyond the means of sustenance, derivable from the soil, or the lower animals in the vicinity, the food of the inhabitants, which is obtained from a similar climate and country, is generally the most wholesome. It is owing to the introduction of many articles of diet, which is unsuitable to the circumstances of the inhabitants of a particular country, or to the climate which that country enjoys, that many disorders originate. And not a few derive their origin from the improper mode of preparing food, which would otherwise be wholesome. Thus the hot spices and highly-seasoned dishes, which, during the intropical rains, would be beneficial to those who live in those climates on vegetable food

almost exclusively, or at least chiefly on it, frequently prove productive of disease amongst the otherwise high-feeding inhabitants of commercial cities. The adoption also of those highly-seasoned dishes, with an undue proportion of animal food—undue, because disproportioned to the productions of the country—is generally a fertile source of disease, and particularly of liver complaints and remittent fevers, amongst the Europeans residing in countries within the tropics.

From these and many more considerations, that might have been introduced, the following corollaries may be inferred: that the climate of a country, in a great measure, determines the general character of the food proper to man, and both mutually tend to produce certain peculiarities of constitution; that while the climate disposes to many diseases, the food, which is more immediately within his reach, is the most beneficial in preventing their invasion or counteracting their fatality; and that, as the nature of the food counteracts the particular rigours of the climate and its noxious effects upon the human system; and as the human organs of mastication and digestion are of a universal character, man is consequently enabled to exist wherever an individual of the animal or vegetable creation is found.

The variety in the food of man forms a striking contrast with the simple diet of most animals. Some have reasoned by an analogy drawn from the animal world, that man ought to confine himself to a single

species of nutriment, that he did so in his natural state, and that his present omnivorous character is a proof of his degeneracy.

This, like all reasoning from wide analogies, leads to erroneous and absurd conclusions. We never, indeed, should forget for an instant, that all arguments drawn from analogies between man and the brutes, ought to be received with the utmost caution. Their specific differences are so numerous, extend to such a variety of particulars, and often present such striking points of opposition, that in reasoning from one to another, the chances are generally against the correctness of our inferences. Experience is the best and safest guide; and, in the present question, experience decides in favour of the omnivorous propensities of man, and of their perfect accordance with his constitution. We conclude that man is naturally omnivorous, when we find him possessed of instruments to procure, masticate, and digest food of all kinds, and that he can subsist in perfect health on vegetable or on animal nutriment, or on a mixture of one and the other.

What is the natural state of man? Is it barbarism? If so, animal food must be deemed most natural to him. The savage who roams the forest, or who paddles in his canoe down the rivers, or along the sea-coast, subsists on the produce of hunting or fishing. In the unsettled state of savage life, vegetable productions cannot be raised with sufficient certainty of abundance for the support of the

human species. The rudest barbarians with whom we are acquainted, who are scattered at wide intervals along the shores of Australasia, derive their support chiefly from the sea. Their diet is occasionally varied, by the flesh of kangaroos or of birds. Sometimes they get a few roots, mix them with nuts or the larvæ of insects, and thus form a kind of paste.

The Greenlanders, the natives of the Kurile islands, *&c.*, the wandering hordes of Asia, and the American hunters are all carnivorous.

Reasoning on this principle we may conclude that earth is a natural food of man, if we regard the practice of some very savage nations. A kind of unctuous clay forms the principal food of some Indian tribes, on the banks of the Meta and the Orinoco. The same practice has been observed in Africa, and in other places. The Otomacs, as Humboldt informs us, live ordinarily on fish, but during the period of the overflowing of the Orinoco, when, from that cause their supply is stopped, they swallow every day, during several months, very considerable quantities of an unctuous sort of clay which they provide for the occasion, and preserve stacked in balls of about six inches in diameter.

But, surely, it is monstrously absurd to call barbarism, the natural state of man. The very essence of man's being is a capacity of improvement and civilization. Reason was bestowed on him by the Author of his existence, to form a mode of life suit-

able to his constitution and climate, to frame associations for mutual assistance and defence; to cultivate arts, to convert the two great kingdoms of organized matter into the means of subsistence, and extend his species commensurately with the limits of the globe. His physical capabilities of sustaining the varieties of climate, and of being sustained on every variety of nutriment, correspond with his intellectual powers.

Connected with this question, there are positions laid down by different writers, respecting the influence of animal or vegetable food, on the moral and physical development of man, that are equally at variance with reason and experience. Some, among whom is Buffon, have asserted that man, without the use of flesh-diet, could neither exist nor propagate his kind in these climates. That he requires not only the solid nourishment of animal food, but a variety of it, to stimulate him to activity, to give vivacity to his senses, perfect strength, and vigour to his frame, courage and energy to his mind. Others, with more fantastic absurdity, have portrayed a state of ideal innocence that never existed, but in their own imaginations, and the fictions of the poets: a golden age, when man lived in a delicious state of idleness and independence, "his food the fruits, his drink the crystal spring." But unluckily a hankering after forbidden flesh seized suddenly upon him: he deserted the vegetable banquet spread for him by the bounteous hand of nature, and in those fatal carnivorous propensities,

originated all the moral and physical evil which has devastated the world for so many ages.

But experience tells us another story. The inhabitants of the northern extremities of Europe and Asia, the Esquimaux, and the people of Terra del Fuego, live entirely on flesh, and that often raw, and yet in strength, size and courage, are far inferior to the rest of mankind. This proves that animal diet does not necessarily confer moral and physical energy. Again, vegetable diet is not connected with weakness and cowardice. The Greeks and Romans subsisted chiefly on vegetable preparations, at a period when their valour and energy rendered them the terror and admiration of surrounding nations. The Irish and Scotch, who are not weaker than ourselves, live chiefly on vegetable aliment. The Swedes under Gustavus and Charles were herbivorous and invincible. The Negroes, distinguished for all kinds of physical energy, live chiefly in the same way; and so do the South Sea Islanders, whose agility and strength were found infinitely to surpass those of our stoutest sailors. On the other hand the debilitating effects of animal food are altogether without foundation; there is not a vestige of evidence that any period ever existed when the whole human race abstained from flesh and lived in a state of perfect innocence and profound peace. This golden age of immaculate virtue is but the creation of poetical fancy, or the offspring of the heated brains of some visionary enthusiasts. That the use of animal food is consistent with the

utmost energy both of mind and body, is amply proved by the experience of every individual. But all history testifies on this subject with a voice from which there there is no appeal. The myriads of Hindoos who subsist on vegetable diet are held in subjection by a few hundreds of Europeans. When the ancient Romans abandoned this vegetable diet they did not decline in moral and physical energy, or in political power. Look at the diet of that nation, which has produced some of the most illustrious names in the records of the human race, whether in literature, science, political, civil, or military eminence; the country of Shakspeare, Newton, Locke, and Milton. With such examples before us, it is monstrously absurd to assert that animal food is productive of any detrimental effect on the development and powers of the human mind and body.

In discussing the point of food, it is natural to inquire whether any light can be thrown upon the subject by a consideration of the peculiar structure of man, and of the points of analogy which it may present to that of other mammalia.

The cheek teeth, as they are employed in masticating the food, should manifest some relation to its peculiar character. In the genuine carnivora they are sharp-pointed, and those of the lower shut within those of the upper jaw. The canine teeth in these species are long, strong and pointed, serving as offensive and defensive weapons, and are sometimes not a little formidable. The herbivorous animals are not similarly armed; their molares present broad

and flat surfaces vertically opposed to each other in both jaws. Plates of enamel are intermixed with the bone, and it appears upon the surface in rising ridges, where its hardness must greatly increase the intended effect of triturating the food. In the carnivora this substance is altogether confined to the surface of the teeth.

We observe an analogy between the articulation of the lower jaw and the character of the teeth in these respective tribes of animals. The only motion of the inferior maxilla in carnivorous species is backwards and forwards, in the herbivora there is besides a capacity of lateral motion, which, in the others, is prevented by the rising edges of the glutoid cavity. This arrangement is in precise conformity with the nature of the aliment destined for each, and their different modes of taking and preparing it. The teeth of man resemble those of the carnivora only in the fact of being superficially covered with enamel. His canine not exceeding the level of the others, cannot be applied to purposes similar to those which the cuspidati of carnivorous animals are intended to execute. The obtuse tubercles of the cheek teeth in man have no resemblance to the pointed projections in carnivorous grinders, nor do they resemble the flat coronal surfaces of the herbivora mingled with enamel. The lower jaw in man, however, has a resemblance to that of the herbivorous tribes in the freedom of lateral motion.

There is a greater general resemblance in the

teeth of man to those of monkeys than to those of any other animal. In the orang-outang, more especially, there is a very striking closeness of similarity*; but in other simiæ the canine teeth exceed ours in length and strength, and the points and ridges of the molares in the same animals do not possess the obtuse tuberculous conformation of those teeth in the human subject.

We shall not pursue the comparison to the organs of digestion, but simply notice that in these, as well as in the teeth and jaws, the human structure approximates more to that of the monkey kind than to that of other species. Now we know that all the simiæ in their natural state are frugivorous.

Still we think it would be unphilosophical to infer from these circumstances that nature designed us for a vegetable diet, or that it would be most proper for us to adopt that regimen altogether. Man has other instruments and means of procuring and preparing his aliment besides jaws and teeth—the process of cookery alters materially the character of his diet. The analogy here is altogether so loose between man and other animals, that we are not warranted in placing much confidence in any deduction which may be drawn from it.

As to what mode of diet, upon the whole, is most conducive to the health and strength of the human body, we have already stated an opinion that this depends entirely on locality.

* It is not certain, however, whether this animal has ever been examined in an adult state. If the pongo be it, the canine teeth are very long and *brutal*.

On the faculties of Mind and the attribute of Speech.

Man has been styled, *par excellence*, a rational animal; but it is astonishing what various acceptations are attached to this epithet. Some seem to think that reason is a faculty peculiarly and exclusively characteristic of the human species. Others would extend this power in greater or less proportions to almost all the living tribes of the animated world beside.

It is almost impossible for us to be acquainted with the mental operations of animals to any great extent. Destitute of language they possess very inadequate means of communicating the results of sensation and consciousness. The only mode we have of judging is by an attentive observation of their actions and a view of certain relations in which they stand with respect to man.

The vast superiority of man appears in a very striking light, when we consider the subjection in which he is enabled to hold so large a portion of the animal world. The most stupid of our species possesses in this respect, a decisive advantage over the most intelligent of the brute creation. Man makes other animals subservient to his purposes, and obedient to his commands. This object is accomplished not by any superior advantages of bodily strength, or activity, but by a power of combining and conducting systematic operations, denied by nature to the lower tribes. The strongest and most sagacious of them have no privilege of

this description over the weakest and most unintelligent. There is no principle of subordination among animals: the most powerful possess no command, the feeblest own no subserviency; the strong, doubtless, devour the weak, but this is the result of urgent necessity and carnivorous instinct. There is no resemblance in this to a regular and systematic series of actions all conducing to one common premeditated end. We discover no traces of such a mode of action in animals, we discover no consciousness of superiority in one species over another. We are justified in believing, that in this respect, all animals are alike, and that, probably, they are not only far inferior in mental character to man, but utterly dissimilar.

Animals never act in concert or co-operation for common purposes in a similar manner, or on similar principles, with man. The associated labour of certain insect tribes, and the joint operations of the male and female in some of the higher orders, which have reference to the supply of food or continuance of the species, do not in strict propriety form any exception to this position. Such operations are the result of a blind instinct, not of any thing similar to human reason; they are never varied in the mode of performance, nor do the animals which conduct them ever enter upon others of a different kind, and for a different purpose. This arises undoubtedly from the limited extent of their powers of observation and reflection, and forms another characteristic distinction between them and man. Another grand

specific difference between animals and man, to which we have already alluded, but on which we shall here add a few words, is the prodigious, the almost illimitable capacity of improvement in the latter. Animals never improve, at least, as species. They perform the same work in the same manner, and in operations peculiar to themselves we discover no gradations of individual excellence or inferiority. Each individual generally remains to the period of his existence, stationary at that degree of advancement at which he arrived in the course of a few months. The lapse of ages has made no improvement in the condition of the species. Animals have no traditionary knowledge, nor can they like man, hoard up the accumulated experience of generations, and bequeath it as a deposit for the use of posterity. Nature has imposed upon them her most imperious command—"Thus far shall ye go, and no farther."

But it is not so with man. Regard him in the origin of society; weak, naked, and defenceless. Nature has clad in defensive mail the armed rhinoceros, provided the lion and the tiger with the weapons of offence, clothed the sheep in wool, and the bear in fur. Every animal she has bountifully provided with all that was necessary for its subsistence and adapted to its destined mode of existence. Man alone she abandoned, unarmed in the midst of dangers, uncovered to the winds of heaven. But she had, nevertheless, bestowed upon him one gift much more than equivalent to all that was denied. She endowed him with inventive genius,

which, stimulated to exertion by his varied wants, soon amply supplied them all, and eventually raised him to his measureless superiority over the rest of created beings. To the perfectibility of man's intellect, no definite limits can be assigned. He has, as we have said, reduced, by means of his intelligence, most other animals to docility and servitude, and such as their native ferocity render incapable of utility and dangerous to his repose, he has banished to the "howling wilderness." The surface of the earth attests his industry and intelligence, and nature herself is delighted to obey him. He has drained the unwholesome marsh, turned the course of rivers, banked out the encroaching sea, and cleared the umbrageous forest; with an energy neither tired by labour, nor disheartened by difficulty, he has succeeded in producing abundance, comfort, utility, and pleasure, the arts which adorn social life, and the blessings which render it valuable. He has scrutinized the mysterious relations of space and time, ascertained the courses and revolutions of the heavenly bodies, and pursued his path with accuracy over the trackless ocean, thus establishing a communication between the remotest nations, and extending far and wide the discoveries of science and the improvements of civilization. When we compare the present state of human advancement, with the rude efforts of society in its earlier stages, we are lost in astonishment; and when we recollect the fact, that the human species is still advancing, probably even at

an increasing ratio of rapidity; that new discoveries, new combinations, and new improvements are daily, nay hourly, making, though we know full well that the human mind is finite, yet who shall venture to fix a boundary, beyond which man shall not pass in his gigantic progress to intellectual perfection. "What a piece of work is man! How noble in reason! how infinite in faculties! In form and moving, how express and admirable! in action, how like an angel! in apprehension, how like a God! the beauty of the world! the paragon of animals!"

The last characteristic distinction between man and inferior animals to which we shall advert, is the power of speech allotted to the former. To this, and the invention of writing consequent upon it, man owes a large portion of his superiority. This power is acquired, not connate in man, like the cries uttered by different animals. Some have supposed that the want of speech in brutes is owing to defective conformation, to an absence of articulating organs. But this opinion is evidently without foundation. The tongue of a monkey is as well formed for all the purposes of speech as that of a man, yet a monkey cannot speak. That the inability to speak results from no organic defect, is clearly proved by the fact of several animals being taught to articulate words and sentences. But this is not speaking; they repeat the sounds like a machine, with no idea whatever of their signification.

Language implies the faculty of pursuing a consecutive train of thought. Brutes are incapable of speech, because they are incapable of such a process of thought. Their sensations are probably as vivid as ours; and memory they certainly possess. They exhibit some imperfect traces of the faculties of comparison, and judgment, but they have no capacity of generalization and abstraction, operations on which the structure of language so intimately and essentially depends. The range of their association is extremely limited, their ideas are few in number, and restricted to the individual objects of sense; and consequently their power of comprehending the relation between thoughts and symbols must be feeble and confined.

The power, then, of speech forms a grand specific distinction in man. It results from the superiority of his intellectual faculties, corresponds with his other high endowments, facilitates the exercise of his mental powers, and gives them their completest development. Without language there would be no more society among men than among the beasts of the forest. The invention of writing and of printing have rendered the prerogative of speech of tenfold additional value to mankind.

We cannot but advert, though briefly, to certain moral distinctions in man which also result from the superiority of his mental powers, and distinguish him specifically from other creatures. In what is generally termed natural affection, there is a striking difference between man and inferior animals. The

attachment of the mother to the offspring is equally strong in both, but it differs materially in the human species as to the period of its duration and the character it finally assumes. In brutes it is apparently purely instinctive, blind, involuntary, irresistible, and lasts no longer than the helpless state of the offspring requires the assistance of the parent: nor is it succeeded by that feeling of tender affection which in man exists through life, a feeling which, holding a due medium between the impulsive force of instinct and the calmer regard of friendship, constitutes the highest enjoyments of human life, and is the basis and cement of society.

The attachment of the dog to his master is certainly a proof in the animal kingdom of the existence of a feeling of a higher order than those which are merely instinctive, and in the individuals of other tribes, we remark, in relation to man, certain demonstrations of a feeling which approximates to friendship. It is very doubtful, however, whether other animals ever form unions of friendship among themselves. We are not in possession of any facts sufficiently well authenticated to justify our adopting the affirmative of this question; the cases of sexual combination for the support and preservation of the offspring, which are merely instinctive, not forming, in our apprehension, any legitimate proof of the existence of what is properly termed friendship. Brutes appear in general to be utterly destitute of mutual sympathy, to be wholly unmoved by the sufferings, and totally indifferent to the joys, of one another.

When we compare man with the rest of animated nature, we view him in a most elevated position, and cannot refrain from the language of eulogy and admiration; but it must be remembered that this very superiority is extremely dangerous, and brings with it a long train of moral obligations, and that when contemplated morally, man presents a very different aspect indeed from that in which we view him zoologically.

Having thus far, however, briefly and imperfectly considered man in comparison with other organized beings, let us now proceed to compare him with himself, and to advert to some of those differences which exist in the various branches of the great family of mankind.

Ethics would be, not improperly, a portion of this division of the history of man, but is usually separated from his mere physical detail.

VARIETIES OF THE HUMAN SPECIES.

1. *Varieties in Colour.*

The colouring matter is understood to reside in a membranous network of greater or less density extending over the surface of the body, called the rete mucosum. This is situated between the chorion or true skin and the cuticle. The rete mucosum, or as it is sometimes called, the cutaneous reticle, con-

sists of a fine texture of vessels, containing fluids of different shades in the black and tawny races. It seems, however, doubtful whether any such membrane for the deposition of colouring fluid exists in white men, though the varieties of fair and dark which we observe among them would seem to require some organization of this kind; nor does this theory sufficiently illustrate the occasional instances of pied or spotted men.

The human skin exhibits various shades of white, yellow, red, brown, and black. There is every possible intermediate shade between the fairest white and the deepest black, but no one gradation of colour is found in all the individuals of any nation. Generally speaking, however, we may refer all the national varieties of colour to the five following classes:

1. White, accompanied with redness of cheeks*. This characterizes all the Europeans except the Laplanders, the Western Asiatics, and the Northern Africans.

Considerable variety will be found to exist in the colour generally called white. The albino possesses a skin of a reddish or a dead white colour, with yellowish white or milk-white hair, and red or very light coloured eyes. The hair over the whole body is unusually soft and white, not of the hoary colour

* Ruddy complexions have been occasionally observed among some of the other varieties. Among the mountaineers of Bootan by Capt. Turner, and the Esquimaux by Lieut. Chapell.

of age, nor the light yellow or flaxen tint of the fair-haired races. It is rather that sort of colour peculiar to a white horse.

These peculiarities evidently arise from a deficiency in the colouring principle, which is much the same in the skin, hair, and eyes. The latter organs are in the albinos peculiarly sensible to the stimulus of light, in consequence of the want of a black pigment, the office of which is to absorb its superfluous portions. Hence we find the eyelids of these people generally closed, and the eyes usually exhibiting some appearances of morbid phenomena. But in twilight, dusk, or even a close approach to darkness, they see remarkably well.

This peculiarity exists from birth, never changes, and may be propagated by generation. Some would refer the albino variety to disease, but this notion appears incorrect, inasmuch as most of the individuals thus characterized are observed to be perfectly strong and healthy. This variety was first observed in the Africans, but it is far from being peculiar to that race. It has, however, never occurred except in detached instances, for though it is observed to be more prevalent in some parts of the world than others, the notion of entire albino tribes has been exploded.

There is another race of men, with a remarkably fair complexion, yellow, flaxen, or red hair, and blue or gray eyes. In these persons the cutaneous capillaries are easily filled, and consequently they exhibit a general sanguineous tint, deeper and more

florid in the face. The ancient and modern Germans belong to this variety, and generally the Danes, Dutch, Swedes, English, *&c.*

Lastly, a race very extensive is found with skin of a brownish white, and dark brown or black hair. The Southern Europeans and Western Asiatics are of this character.

2. The second grand variety in human colour is yellow or olive. This characterizes all the Mongolian tribes, and, generally speaking, most of the natives of Upper Asia.

3. Is the red or copper colour, which in various shades is prevalent over the entire American continent, and chiefly confined to it.

4. Brown or tawny. This in lighter or darker variations belongs to the inhabitants of the peninsula of Malacca, and is extended through most of the islands of the Pacific Ocean.

5. Black, in an amazing variety of shades, characterizes all the African continent, the northern and southern parts excepted, New Holland, Van Dieman's Land, New Guinea, New Hebrides, and some other islands of the South Sea. It is mingled with the ordinary colour of the natives in Brazil, California, and India.

It is not to be supposed that these different colours, thus generally described, prevail each of them uniformly in all the individuals of the race; on the contrary, there are considerable gradations, and even tribes have been found among the Americans, and individuals are constantly produced in each respec-

tive race with characteristics approaching to those of some other.

Children born from an intermixture of different races hold generally a middle station between the two. Thus the Mulatto forms a medium between the African and European. The colour will be more or less dark according to the complexion of the European father or mother. The cheeks are not ruddy, and the hair is black and curled, but less short than the negroes. The iris is always dark.

From the Europeans and Mulattoes proceed what are called Tercerons. These generally resemble Europeans. The hair has nothing of the woolly curl, the skin has a slight brown tint, and the cheeks are red. The offspring of these last and the Europeans are not to be distinguished from our own race. An opposite course will reduce the Mulatto offspring to the characters of the negro, and by intermixture with the latter, the fourth generation will be perfectly black.

From the native Indians and the Europeans are born Mestizos. They are much lighter than the Mulattos, and often not distinguishable in colour from Europeans. The small beard, hands, and feet, and the obliquity of the eyes, mark their Indian blood. The offspring from them and European fathers are in all respects like the Europeans.

From Negroes and Americans spring Zambos, resembling Mulattos, but darker.

Among the dark races are sometimes found persons spotted with white.

Under this head of colour we shall briefly notice the varieties in the hair, beard, and iris.

The structure and properties of the hair are closely allied to those of the skin, and it derives the means of its growth, and probably its colouring matter, from the cutaneous vessels. Each hair may be traced through the cuticle and surface of the cutis to a bulb partly in the chorion and partly in the cellular membrane. This bulb consists of a thick outer covering, in which the root of the hair and a vascular pulp by which the root is secreted, are contained.

There is a close analogy between the skin and hair. The latter, in the albino, as before observed, is soft and white. A light complexion and thin skin are usually accompanied with fair or red hair, and darker hair usually belongs to a dark colour and thick skin.

In the coloured varieties of the human race, the hair is black and always coarser than that of Europeans. In the spotted negroes the hair growing out of a white patch on the head, is white, a presumptive proof that the colouring matter of the skin and hair is the same.

The principal differences in the hair are four. 1. Brownish, deviating into yellow or red, or into black. It is copious, long and soft, and characterizes the natives of the temperate climates of Europe, and somewhat stronger and darker belongs to the eastern Asiatics and northern Africans, and the Celtic and Slavonic races in Europe.

2. Black, strong, strait, and thin. This character

of hair belongs to the American and Mangolian varieties.

3. A softer black, thick and curled, is found among the South-sea Islanders.

4. Black and crisp, in all the negro tribes.

It may be proper to notice here that the hair of the African has been ascertained to bear no resemblance to wool except in appearance, and that it has all the characters of true hair.

The above divisions hold good generally, but we find, as in colour so in hair, many individual exceptions in the different races.

As great differences are observable in the various races in point of beard, as of hair generally. Most individuals of the dark races are remarkably deficient in this particular. The Mongolians have much less beard than the Europeans, and it grows later. The Calmucks have small and poor mustachios, and very little hair on the body. The Burats are nearly beardless, so are the Tungooses and other hordes of Eastern Siberia. The Chinese resemble the Mongolian tribes in this particular; but contrary to their practice the latter encourage the growth of beard. The custom of exterminating the beard and hair on the body is common among many of the dark nations, but this would not have been attempted and could not be executed if nature had furnished them in this article so plentifully as she has done the Europeans.

There has been much controversy whether the native Americans have beards or not; it is now com-

pletely ascertained that they have beards, but weak and imperfect, and that the practice of exterminating them is general.

The genuine Negroes have very little beard or growth of hair over the body. But the South-Sea islanders are by no means deficient in these excrescences.

An analogy similar to that between the hair and skin exists between the latter and the iris of the eye. New born children in Europe have generally light eyes and hair, and both gradually darken in those of dark complexion.

In old persons as the hair turns grey the eye loses a portion of its colour. In the albino there is an entire deficiency of proper colouring matter, so that the iris has a reddish hue from the colour of the blood in the capillaries. The same sympathetic variations in the skin, hair, and eyes are also observable in other animals.

The principal colours of the human eye are blue, passing to greyish in the lighter tints, a sort of obscure orange, a kind of middle tint between blue and orange, sometimes very green in red-haired persons; and lastly, brown, verging to hazel on the one side, and black on the other. To these the reddish eye of the albino may be added.

These varieties occur constantly in individuals of the same race and family. Sometimes they are confined to particular tribes of the same nation. The Gothlanders of Sweden are described with light hair and greyish eyes. The Finlanders with

yellow hair and brown eyes, and the Laplanders with both black. Blue eyes with yellow hair have always marked the Germanic tribes. Blue eyes with black or dark hair form a combination not uncommon among the tribes of Koordistan, and others of the Caucasian race, who inhabit elevated situations in Asia. The iris is dark in all the coloured varieties, but in the Negro it is so black as to be distinguished with difficulty from the pupil.

On the varieties of the human Face and Form.

No two persons are ever met with possessing precisely the same sort of features; yet there are certain generally characteristic countenances belonging to the different races of mankind, and even to particular nations. To enter into all the minute variations would be endless, but they have been reduced by Blumenbach to the five following, which include all the leading traits:

1. An oval countenance, with the features moderately inter-distinguished; high and broad forehead; nose aquiline, or slightly convex or prominent; cheek-bones not prominent; small mouth and lips slightly curved; chin full and well rounded. This face is most consonant with our ideas of beauty, and is characteristic in greater or less degrees of perfection of the Caucasian tribes.

2. Broad and flattish face*; parts ill-distinguished

* Though Cuvier has briefly specified some of these distinctions, we conceived a condensed view of them in this place would be useful, in enabling the reader the better to make such variations as our author has omitted.

from each other; space between the eyes flat and broad, flat nose; projecting cheeks; narrow and oblique eyelids, and chin rather prominent. This is the Mongolian face.

3. Broad, but not flat visage; prominent cheek-bones; short forehead; eyes deeply fixed; nose flattish, but prominent. Such is the American face.

4. Narrow face, projecting below; narrow, retreating and arched forehead; prominent eyes; thick nose and lips, *&c.* Negro face.

5. Face, not so narrow as the last, rather projecting downwards; bottled nose, and large mouth. Malay countenance.

Placing these variations of the human countenance thus beside each other, the difference appears very striking. But we must repeat of the characters of countenance above described, as of those of colour, that they are by no means to be found the same in all the individuals of each respective race; on the contrary, individual deviations from the given type are numerous. Among the African and American nations, many persons are found with features as regular and as handsome as any Europeans. The same is more especially true of the South-Sea Islanders. Among ourselves how many have the characteristic features of other races. It may be observed, however, that rather less deviation from the characteristic model is observable in the Mongolian than in the other varieties. Though even there there is considerable difference, if not in form, at least in expression of features. As

for example, between the Calmuck and the Chinese.

From the features we naturally proceed to the skull. This, in the Caucasian variety, is more fully developed in the upper and front parts, these forming a large and smooth convexity, a little flattened towards the temples. There is a general softness, harmony, and proportion in the entire contour of the head. Some differences in the formation of the skull have been observed in different nations of the Caucasian race; in the Turks, for instance, a singular globularity of this part has been remarked; and in the Poles and Russians a considerable contraction of the orbits. But we have not sufficient information on this subject to lead us to any definite conclusions.

In the Mongolian variety the head is of a square form with the forehead low and slanting. The orbits are large and open, and the superciliary arches elevated.

In the Ethiopian variety the front of the head is laterally compressed and considerably elongated, so that the length of the whole skull from the teeth to the occiput is great. It forms a complete contrast to the globular head of some Europeans, and to the square head of the Calmucks. The forehead is wonderfully narrowed off, and the face widened below; the frontal bone is shorter, and it and the parietal less excavated than in the European. The temporal ridge is higher; the compression of the front of the skull arises from the strength of the temporal

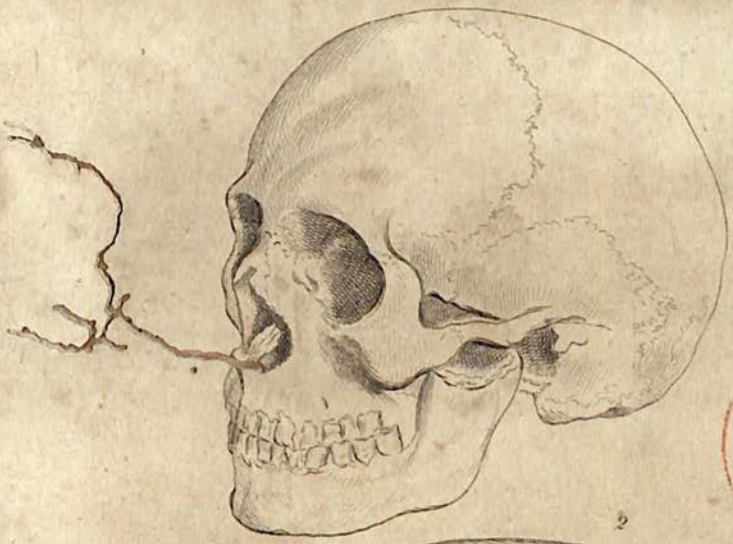
muscles; the foramen magnum is larger and farther back, and the apertures for the nerves are larger; the bony substance is hard, and the whole weight of the skull more considerable; the organs of sense are more developed, and the narrow forehead, and protruded muzzle give to the negro head a decidedly animal character. We have inserted outline figures of the skull of these three leading varieties of mankind.

Some of the South African tribes vary a little from the negro conformation of skull. In the head of a Bushman, given by Blumenbach, the cranium is less compressed, the orbits and cheek-bones are wide, and the jaws not prominent. There are other differences, but we scarcely know sufficient of these tribes to class them under any given variety. The origin of the Hottentots, Caffres, Bushmen, and their subdivisions, found at the extremity of South Africa is quite unknown. They exhibit characters strongly approximating to, and discrepancies equally deviating from their negro neighbours.

The American head is thus characterized: broad cheek-bones, depressed forehead, deep orbits, and the nasal cavity generally large.

The Esquimaux and Greenlanders, who seem to form a link between the Americans and Mongolians, have broad cheek-bones, large jaws and face, flattened nose, the cranium sufficiently ample, but distinguished by a posterior elongation.

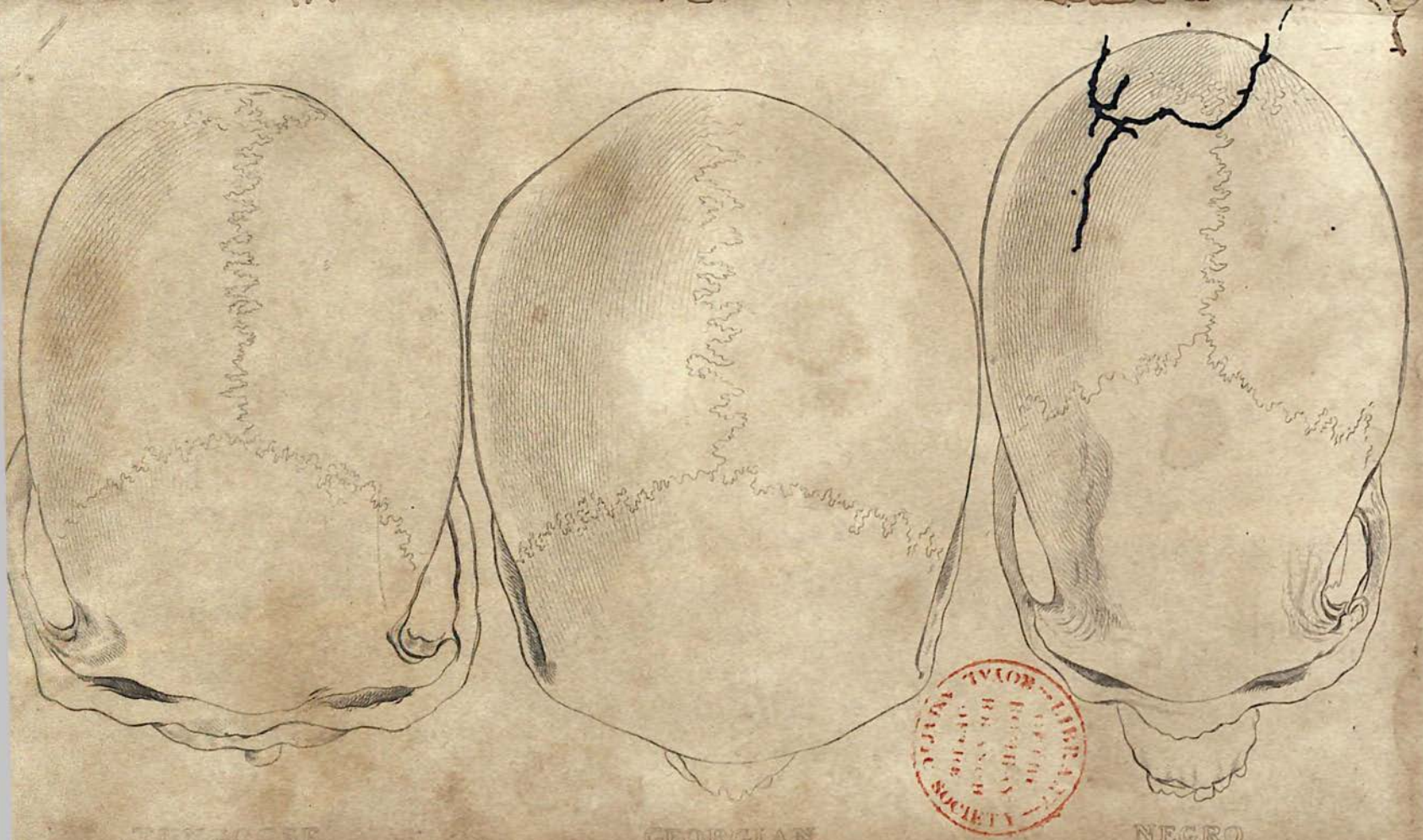
The Carib tribes are conspicuous for a most remarkable depression of the forehead, which defect, like others of the Americans, they increase by arti-



BRANCH OF THE MEDICAL SOCIETY

1. GEORGIAN FEMALE. 2. NEGRO. 3. KALMUCK.

London, Published by G. & W. B. Whittaker Feb.1824.



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ficial means. The hinder parts of the skull greatly preponderate; the face is large and muscular; the nasal bone neither small nor flat; the cavity is large, and the jaws and teeth exhibit manifestations of great strength.

The general characters in this respect attributed to the Malay variety are, a moderately-narrowed cranium slanting at the interior and upper part; face large, and jaws prominent. But, indeed, the numerous nations comprehended, with not much philosophical precision under this variety, exhibit very various and opposing characters; some are not distinguishable in the formation of this part from Europeans, some partake of the Mongole, and many of the Negro type. In truth, the above division of skulls is somewhat arbitrary, and though sufficient for general purposes, is, by no means, universally applicable.

The only natural variety in the teeth of the human species consists in the oblique position of the anterior incisors in the Negroes as may be observed in the plate. Artificial differences can have no place in this division of the subject.

We proceed to other variations of form. The occiput of the Negro projects less behind the spine than the same part in Europeans, in consequence of the foramen magnum being farther back in the former. The Mongolian tribes are characterized by a broad, square, and robust, body, limbs short and muscular, and high shoulders.

The trunk of the Negro is smaller than that of the European, especially about the hips and pelvis.

The same slenderness of trunk is observable in the Hindoos, and is accompanied with length of limb. The South Sea Islanders are generally remarkable for strength, stature, and symmetry of form. The natives of New Holland and Van Diemen's Land, are of small size, with long and slender limbs. Their diminutiveness and mal-conformation have been conjectured to be owing, in a great measure, to the bad quality and deficient quantity of their food—but probably without foundation. The lower arm is generally longer in Negroes, in proportion to the upper arm, and to the height of the body than in Europeans. The Hindoos are remarkable for long legs, and the Mongolian nations for short ones, in comparison with Europeans.

We may observe that the bones of the leg, in Negroes, are pushed outwards, under the femoral condyles, so that they seem more distant from each other than with us, and the feet are turned outwards; the tibia and fibula are also particularly convex; the calves of the legs are high, and the feet and hands flat. The os calcis is nearly in a straight line with the other bones of the foot instead of being arched, and the foot in general is remarkably broad; the fingers and toes are very long and flexible.

Smallness of hands and feet seem peculiar to some races, as the Hindoos and Chinese, the Esquimaux, and many of the American tribes, *&c.*

Artificial changes of form produced in individuals, and fabulous varieties mentioned by some writers, we deem it unnecessary to notice.

In Europe the human stature varies from four feet and a half to six feet. Individuals of six feet and some inches are not uncommon. In various parts of the world, men have reached to the height of seven, eight, or nine, feet; beyond this, the accounts seem fabulous: the large bones on which such stories have been founded, modern science has ascertained to belong to other animals.

Among individual instances of diminutiveness in the human species, authentic accounts go as low as twenty-one inches.

In the Caucasian variety there are no strongly marked national deviations from the ordinary stature. In some parts of Switzerland and Sweden, the natives are rather distinguished for height. The Finlanders are rather short. The Latin writers have remarked the stature of the ancient Germans; it is probable that they did not exceed the modern Germans in this particular.

The Americans exhibit greater varieties in stature than the Europeans. The Peruvians are generally low, but well proportioned. The people of Terra del Fuego are small and ugly; so are the tribes of Nookta Sound. The Chaymas of South America are short, while the Payaguas, the Guayquilits, and the Caribees are almost gigantic. Many of the Canadian tribes are very tall. The accounts of travellers respecting the Patagonians, have been various and contradictory; from a careful comparison of statements, we conclude the average height of this nation to be from five feet ten inches to six feet and a half.

Similar differences occur in the Ethiopian variety. The Negroes generally correspond in stature with Europeans; the Hottentots are usually smaller than other Africans, and the Bushmen are remarkably short. The Kaffers are distinguished for their stature, and the muscularity and symmetry of their figures.

The Mongolians are generally shorter in stature than ourselves; but considerable varieties are found among them. The Chinese and Japanese are about our own size. The Calmucks, Burats, *&c.* are shorter; the people of Loo Choo are a diminutive race, five feet two being the limit of their average height. The Laplanders, Samoiedes, Greenlanders, and Esquimaux are all short; Captain Parry found no individual among the last above five feet ten; the average was five feet four, five, and six, inches. It has been reported that a nation of white long-armed dwarfs existed in the island of Madagascar, but there appears no foundation in truth for such a story.

Differences of Language and intellectual Varieties.

A very curious point of difference in language is the existence of monosyllabic languages over a very large portion of civilized Asia; the words are radical sounds of one syllable, which admit neither inflection nor composition: such are the languages of Thibet, of China, of Goa, Pegu, Siam, Cochin-China, and Tonquin, There is no distinction of parts of speech; thus one and the same word signifies *joyful,*

joy, and to *rejoice*, and this through all persons, numbers, and tenses: the poverty of such languages forms an invincible impediment to the improvement of those who use them. This pecularity of language does by no means attach to all the Mongolian nations. The Mongoles, properly so called, the Calmucks, the Burats, all bordering on Thibet, and deriving their language thence, have dropped the monosyllabic character. The Mantchews and Japanese speak a polysyllabic language.

America is distinguished for the amazing variety of its languages, and their want of connexion with each other. Many of them, the Mexican in particular, have a great capacity of inflection and composition, and are eminently polysyllabic. In all the languages spoken by the Caucasian races, there is a great affinity; of the African tongues our information is but imperfect.

We may venture to lay it down as a general position, for the truth of which all history may be made to vouch, that the white races are decidedly superior to the dark in intellectual and moral qualities.

The New Hollanders, and the savages of Van Diemen's Land, are not less morally than physically degraded. They practice the most unfeeling barbarity to women and children; are implacable in revenge, and destitute of natural affection; they have no moral sense, no idea of a God, no religion, and but a rude notion of a future state, utterly unconnected with any theological system.

A moral and intellectual inferiority, more or less

general, characterizes the native American, the African, the Mongole, the Malay, and the numerous tribes of Australasia and Polynesia. Want of mutual sympathy, want of pity, want of principle, belong to them all. Their barbarous tyranny over the other sex just alluded to, their unrelenting wars, horrible cruelty to captives, and practice of cannibalism, are lamentable proofs of the truth of this.

However, it may be remarked, that there are many exceptions. The inferiority of the dark races in intellect is much more strongly marked than in moral qualities. Many of the Negroes are remarkable for goodness of heart and affectionate fidelity in a very high degree. The empires of Mexico and Peru prove that the Americans are not incapable of civilization, and the successful efforts of the Araucans to mainta in their independence, prove that some tribes of this vast continent are fully equal to any of the old, in the noblest attributes of our nature. The Indians of America are, many of them, remarkable for unshaken fortitude in suffering, and unparalleled fidelity in friendship.

There is considerable difference among the Mongolian tribes in intellectual and moral character. The Chinese and Japanese have made a considerable advancement in all the arts of civilized life, but the fact of their having continued stationary for so many ages, seems to indicate an inferior capacity to the white races.

The Mongolian nations of central Asia, have repeatedly sent forth hordes of warriors, who have car-

ried desolation through the finest countries in the world; but their conquests were distinguished for nothing but unrelenting slaughter, and universal destruction: their career was unmarked by any traits of generosity, of pity to the vanquished, or consideration for the rights of mankind.

The white races of mankind present as complete a contrast to the dark in moral and intellectual, as they do in physical complexion. We have no record of their existence as mere hunters and fishers. They either were never so low as the others, or they quickly emerged from this state of utter barbarism. In the earliest accounts, we find them in a pastoral or agricultural state. To them is due the first invention of arts and sciences, and their subsequent progress. Among them have originated the only religions which present worthy views of the Deity. Patriotic and social feelings have here, only, arrived to their highest refinement. They only have possessed free governments, and even the absolute monarchies that have existed among them, have been tempered with a regard to justice and equity, perfectly unknown to the darker tribes.

We would be understood to assert, that this superiority is only general, not universal; many individuals of the darker races and some tribes are considerably beyond the rest; many Europeans are morally and intellectually much inferior to Negroes. Among the latter, much ingenuity is often exhibited. Most of the artificers in the West Indies are blacks. Many are expert musicians. The case of Hannibal,

a colonel in the Russian artillery, and of Lislet, of the island of Mauritius, prove the capacity of the Negroes for the mathematical and physical sciences. Amo, an African, in 1734, took the degree of Doctor at the University of Wittenberg. Capitein, another Negro, studied theology at Leyden, and published several sermons and poems. The instances of Ignatius Sancho and Gustavius Vasa, in this country, are well known. But still, these exceptions prove nothing against the general inferiority, which, without entering into more controversy, may be safely rested on the continuance of the Ethiopian races, for more than twenty centuries, in a state little short of the most absolute barbarism.

Of the Causes of the Varieties of the human Species.

This question we shall dismiss very speedily; first, because nothing perfectly satisfactory has yet been adduced on the subject—and secondly, because the limits to which a supplement, like this, should be confined, necessarily restrict our investigations. The difference of colour has usually been attributed to the influence of climate, and that by such high authorities as Pliny, Buffon, Smith, and Blumenbach. But climate is insufficient to account for this difference. Its effects are found to be limited to the individual, and not to extend to the offspring, as the fact of children being born in hot climates perfectly fair, and not partaking of the effects of the climate on their European parents, and whole races

of Caucasian origin remaining unaffected for ages by the influence of the torrid region to which they had emigrated sufficiently prove. The uniform colour of all the parts in the Negro furnish an argument against the effects of climate. We find also, in examining the dark races, that the same people inhabit the most different climates without any corresponding change of colour. In the countries nearest to the pole, in Europe, Asia, and America, are to be found very dark races of mankind. The Moors and Arabs are born perfectly fair, and continue so unless much exposed. But the Laplanders and Greenlanders, though never subjected to the influence of even a moderate sun, are dark, nay sometimes black. Buffon, to be sure, has maintained that extreme cold will produce the same effect as extreme heat in darkening the skin. But if so, we should observe some approximation to this dark colour in the inhabitants of such climates as approach in intensity of cold to the arctic regions. But the reverse is the fact. Climate will no more account for other varieties, than it does for that of colour. The same physical characters, with a very trivial variation, belong to all the natives of Europe, except those of German and Mongolian origin, to the Western Asiatics and the Northern Africans. Climate cannot cause this similarity of character in nations, spread over fifty degrees of latitude; nor are food, dress, or any other such causes adequate to its explanation. The Mongolian tribes are scattered over an immense tract of the earth, under the

influence of very material diversities of climate; yet, from the southern extremity of China to the banks of the Oby, these nations preserve, with little variation, their original and peculiar characters. It is remarkable, too, that whatever difference of colour is observable among them, is fatal to the theory of climate, inasmuch as the Mongolian races in the higher latitudes, are darker than the same people in more southern regions.

We find two very distinct races of men inhabiting the various islands of the Indian and Pacific Oceans. The one approximating very closely to the characters of the Negro, the other differing from them widely, and from similarity of conformation and language, generally referred to a Malay origin. We find these different races constantly localized, without any correspondence to the diversity of climate. The woolly headed-black is found in the high southern latitudes of Van Dieman's Land; and the fair Otaheitan approaching the Equator. The fairness of the Sumatrans beneath a vertical sun and in a region unknown to winter, is considered by Mr. Marsden as conclusive against the opinion, that colour is the effect of climate. If the theory which we combat were true, it would follow that the African tribes beneath the Equator should be the blackest of mankind, and that as we recede from this line, the people should grow gradually of a lighter hue. But on the contrary, the Abyssinians near the Equator are olive-complexioned and have long hair, and are surrounded by Negroes. The

Gallas, under the line itself, are long haired and of a brown colour; and proceeding to the south we find tribes of the blackest Negroes.

In America, in the same way, such variations of colour as exist, do by no means correspond with the variations of climate. The Indians of New Spain, according to Humboldt, are more swarthy than those of the warmest climates in America. The people of the banks of the Rio Negro are darker than those of the Lower Orinoco, though living in a much cooler region. It is remarkable, that this difference has much less observable effect on the other varieties of mankind, than on the Caucasian race.

The Germans of the present day retain the light hair and characteristic complexion of their ancestors. The descendants of the Celtic tribes in Europe, are still brown-haired, and darkish like their progenitors. Nine centuries have not altered the characteristics of the Normans in France, nor eight those of the Caucasian Guebres in the sultry island of Bombay. The descendants of the yellow-haired Vandals are still to be found in Barbary, and recognised by their colour. The Jews, scattered by the fiat of Heaven over the face of the whole earth, preserve in every latitude the colour and peculiar physiognomy of their nation. It is, however, much more easy to disprove any of the theories that have been invented to account for the varieties of mankind, than it is even to suggest any probable cause for such tendency. For if we attempt

to carry ourselves back to a period, when there was but one race of men, to ascertain the characters of that race, and to show how it first deviated into the varieties we now behold, we shall find ourselves involved in the utmost difficulty—a difficulty which, if possible, is increased by the fact, that from the earliest period of authentic history, the varieties existed which now exist, equally separated and distinct from each other. Dr. Prichard has written a most ingenious work to prove that all men were originally Negroes. Blumenbach embraces an opposite opinion, and with the more reason, as we observe in the Caucasian race, a greater tendency to individual variation than in any other.

Many persons, misled by the sophisticated idea of believing nothing they cannot demonstrate, and selecting instances of the most opposite conformations from amongst the human varieties for comparison, have been induced forcibly to doubt the unity of the human race. The jet blackness of the integument of the negro, and his woolly hair, the extraordinary posterior projection of the South African Bush people, or any of the most prominent and remarkable peculiarities by which certain races are marked, when compared with what we see constantly before our eyes, certainly raise a presumption *primâ facie* that persons so opposite cannot have descended from a common root. As this is a favourite position of scepticism, it may be proper to pause and consider it, and to show that though we cannot ascer-

tain the causes which promote the tendency to vary in mankind, yet that such tendency does clearly exist in other animals, and therefore, by analogy, that it exists also in man, and is sufficient to account for, if not to explain, the phenomenon in question.

It has been already stated from Cuvier, that varieties in zoology consist of such differences as arise between the descendants from one common stock. The difference between immediate collateral relations are those of individual description, but when these become hereditary, then may they properly be called varieties. These hereditary varieties always propagate with each other, while animals specifically different, seldom do, and when instances occur, the hybrid offspring is not prolific; or, at least, not beyond one or two descents. That the natural barrier between the species has been evermore effectually destroyed, so as by the connexion of two to produce a third, distinct from either and permanently prolific, has never been satisfactorily proved.

The integrity of all the individuals of mankind, as a single species, may be tried and proved by this test. The whole human race is prolific by promiscuous intermixture.

It must not be forgotten also, that, although there are black races and white races, there are individuals of almost every tint leading from one of these extremes of colour to the other; although there are races with a facial line nearly vertical, and others

with the same line greatly inclined, there are individuals who display every possible degree between these differences. Where then shall we draw the line of separation if they are not all from a common origin?

The different species of the same class with us, the mammalia, ramify into varieties as notable as any of ours. Not to accumulate instances, let us select pigs as illustrative of this, because, in certain particulars, they are more assimilated to us; like us, they are found wild and domesticated; they are carnivorous; very much spread over the different countries of the world, and have consequently their tendency to variety from local circumstances more excited. Having been also much transported by us from one country to another, the progress of degeneration or variety has been very extensively observed.

The wild boar is remarkable for his long and powerful tusks as well as other personal traits which distinguish him from his domesticated congener, but the young of the wild swine, taken early and domesticated, cease immediately to possess these powerful weapons, and lose all the characters of the wild animal; while, on the other hand, domesticated pigs having escaped to the forest, have so far assumed the appearance of the wild inhabitant of it, as to be shot for such, and known only to have been once in the power of man, by being found castrated, when opened.

In Piedmont the swine are all black; in Bavaria

they are reddish brown; and in Normandy they are white. Colour, therefore, with them as with mankind and most other animals, is one of the most variable of specific characters.

Light hair in the human race is generally soft and silky; in the dark varieties and Negroes it is coarse or woolly. Analogous to this, the white swine of Normandy have the hair so much softer than other varieties, that their bristles cannot be made use of by the brushmakers. The hair of the wild boar is much more strong and coarse than in any of the domesticated varieties.

The crania of the different varieties of swine present differences of conformation, at least, equal to those between the most opposite of the human race, as we shall have occasion to show hereafter.

The great length of legs of the Normandy swine, from which the English usually compare them with greyhounds; the solid hoofed herds found in the north of Europe, and the several transatlantic varieties, exhibit differences of mechanical structure far more striking than any to which mankind have been subjected.

If, however, difference of mental powers be allowed as indicative of variety in the human race, no fair analogy can certainly be presented to it in the inferior animal creation. It is not possible to doubt the existence of considerable difference in this respect among individuals independently of all education. A single family will frequently evince it, and

it would be almost as absurd to doubt the descent of two brothers from the same parents because they differ in personal appearance and intellectual capacity, as it is to doubt the descent in the pedigree of mankind from a common trunk of the several ramifications marked by physical as well as moral differences.

Whether the latter of these differences in any degree depend upon the former, is a distinct question, to which we have already alluded: but whether this position be partially or altogether true or false, we are fully warranted in concluding, both from the comparison of man with inferior animals, so far as the inferiority will allow of such comparison, and beyond that, by comparing him with himself, that the great family of mankind loudly proclaim a descent at some period or other from one common origin.

GENERAL OBSERVATIONS

ON THE VARIETIES OF THE HUMAN SPECIES AND A SKETCH OF SOME OF THE MORE REMARKABLE RACES.

Cuvier, as we have seen, has divided the human species into three grand varieties, the Caucasian, the Mongolian, and the Æthiopian; to these Blumenbach and others have added two more, namely, the American, and the Malay.

It has been already remarked that these or any other divisions of the human species into varieties, are, in a great measure, arbitrary; that the individuals comprised under each of them are so far from being all alike, that they exhibit various and sometimes strongly contrasted modifications; that in each variety we find numerous individual approximations to some other; that every tribe and nation has characteristics of face and form that might almost entitle it to class as a separate variety, and yet that all agree so far, as evidently to constitute but one and the same species, and to be referable to one common origin.

We propose, therefore, in addition to what has been already advanced on the subject of the three great varieties, to add a succinct description accompanied with portraits of some of the minor races, which seem to stand next in order from their num-

bers and importance to the three divisions of Cuvier.

All the minor races may, indeed, by certain traits of similarity, proclaim their original descent from one of these three; but if this be so, it is impossible for any one to come satisfactorily to that conclusion without comparing them; and to this end, some particulars by way of selection of the principal minor races may be partially subservient.

The American variety appears to form a link between the Caucasian and Mongolian, but approximating more to the latter. The skin is dark, with more or less of a copper tint. The hair is straight and black, the beard small, forehead low, eyes dark and oblique, face broad and prominent, and cheeks rounded. The features in general, particularly the nose, are more distinct and projecting than in the Mongolian type. The mouth is large, and the lips are rather thick.

Among the Americans, however, are found many deviations of colour and stature from this general character, though but few of structure and features. The people of Nootka Sound are nearly as light as Europeans, but of a dull paleness; so are some of the Peruvians. Mr. Birkbeck observes that the natives of the western territory of the United States are various in complexion, some dark, some lighter, but he met with no examples of the copper colour among them. The Chilians are of a reddish brown, but clear; and a tribe of the province of Barva are red and white like ourselves.

NORTH AMERICAN.

SEWEE SUSSING CHIEF OF THE POWAN INDIANS.

C. Hamilton Smith Esq. del.

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The depressed forehead is a more general characteristic of all the American tribes; some of them, it is true, increase by art this natural peculiarity; but the character is prevalent among those who use no art to exaggerate it. A depressed forehead is always considered beautiful among them: the *Aztec* gods and heroes were thus represented by the Mexicans, who used no artificial means to flatten the cranium.

There is strong reason to believe, especially from the approximation of the two continents, that, the American race originates from the north-eastern Asiatics; traces of resemblance in language, strong and physical similarity, and local facilities of emigration, give countenance to this opinion.

There seems no just reason for separating the Esquimaux from the American variety, and classing them more particularly under the Mongolian; at least, no reason that would not justify a similar classification of the nations of the whole American continent. They resemble the Americans in general characteristic traits; and, in Terra del Fuego, and on the Mosquito shore we find people exactly like them. With the physical characters of this arctic race, the late voyages to the Pole have made us tolerably acquainted. They have high cheek-bones, broad foreheads, and small eyes far apart. Their complexion is a dusky yellow, and some individuals are lighter than others, and exhibit some symptoms of red in the cheeks. Their stature is short, the average height of the males not being more than

five feet five or six inches. The women are still less; their proportions are by no means robust, and they are remarkable for the smallness of their hands and feet. The Esquimaux are not very stupid, nor much distinguished for intelligence. They have very imperfect notions, if any, of a Supreme Being, and some rude ideas of a future state. They exhibit considerable ingenuity in the construction of their houses, their canoes, their clothes, and various implements. They appear remarkable, notwithstanding the severity of their climate for longevity.

The Malay division, a fifth variety of the human race, is, as we have observed, but ill defined. It is made to embrace more diversified and contrasted portions of mankind than any of those before mentioned. It is difficult to assign to them any common characters. We may say, in general, that the colour is brown in various shades, from a light tawny to almost a black. The hair is black, copious, and generally curled. The head is rather narrow; bones of the face prominent; nose full and broad; and mouth large. Under this variety are generally classed the natives of the peninsula of Malacca, of the islands of Sumatra, Java, Borneo, Celebes, and the adjacent isles; of the Molucca, Ladrone, Philippine, Marian, and Caroline clusters; of New Holland, Van Dieman's Land, New Guinea, New Zealand, and all the islands of the Pacific Ocean. The enterprising spirit of these people has induced them to migrate considerably, but whether these several

MALAY.

NATIVE OF SOLOR.

Griffith

London Published by G.B.Whittaker March 1827.

islands owe their population originally to them, may well be doubted.

In the southern Asiatic, or East-Indian islands, we have already noticed that there are two very different races of men; the first have a strong resemblance to the African Negroes, in the black colour, woolly hair, and general form of the face and skull. Their language, however, is different, and they have a copious beard. They have been considered as the aborigines of those islands, some of which they occupy altogether, but in others are found only in the mountainous and interior regions. They are met with in Sumatra, in Borneo, in the Moluccas and the Philippines. They entirely occupy the Great Andaman Island, which Colonel Symes visited on his voyage to Ava. He describes the natives as very short, with slender limbs, large bellies, high shoulders, and large heads; with woolly hair, flat noses, and thick lips. They are in a state of the most destitute misery and utter barbarism. Their persons, except in regard to beard, bespeak a descent from central Africa, but even conjecture can scarcely imagine when or how.

The rest of the people of these Indian islands are of a lighter colour, have the face more oval, the hair long, and superior figures. In their organization, language, and manners, they approximate to the natives of Malacca. They usually occupy the sea-coasts of these islands, but some of the smaller ones are entirely inhabited by them. But we shall conclude our treatise by noticing some of these remote people more particularly.

The continent or island of New Holland, for it will bear either of those appellatives with propriety, is certainly inhabited by various sets of people, as far at least as differences of general appearance, language, and territory constitute variety; but from our hitherto imperfect knowledge of this immense country, we know not to what extent these varieties run, more especially in the interior.

The natives with whom we are best acquainted, inhabiting the vicinity of Botany Bay, Port Jackson, and Broken Bay, are in general of moderate stature, and ill made. Their limbs, almost universally, are very small and thin. The dwellers near the coast subsist almost exclusively on fish; those, on the other hand, who live in the woods are almost as exclusively carnivorous, but depend entirely for a supply to the uncertain produce of the chase, or rather to the casual surprise of opossums and small animals in the trees. The latter, Colonel Collins informs us, are observed to have longer arms than their compatriots of the coast.

The features of these people are generally pleasing, especially of the women, who are less deformed by the foreign ornament of a bone or reed thrust through the cartilage of the nose or ears.

Like the south Africans, and other savages, these people of both sexes anoint their bodies all over with oil or grease; a practice which probably originated as a protection against the attacks of stinging flies, musquitoes, and even the arid air. They also draw lines all over the face and body on par-

ticular occasions of combat or ceremony with coloured clay, in addition to the more permanent ornaments of scars or seams, the result of self-inflicted wounds. The males, on attaining the age of mankind, have one of the upper incisor teeth punched out, an operation performed on large numbers at a time and with the most ridiculous ceremonies. The women have the little finger of the right hand also mutilated by amputation of the two first phalanges.

Their senses in general, in common with all savages, are very acute; that of sight in particular has been observed with admiration by all Europeans who visit them. Parturition is also comparatively easy among their women, who are generally enabled in a few hours after to pursue their ordinary occupations.

The colour of the natives in question is observed to vary, though the more than ordinary filth of some individuals among them may impart an unnatural blackness to the skin; generally the tint of the skin is that of copper when sufficiently cleansed to show it. Their hair is either curling or straight, not woolly like that of the negro. In a few it has been observed to have a reddish cast.

In disposition, these savages evince the qualities of general good-nature, but occasional deadly revenge, inflexible courage in bodily suffering, jealousy, idleness, independence, and cunning: to their previous bad qualities must also unhappily be added

some that seem to result from their intercourse with the outcasts of European society, especially drunkenness, one of the greatest banes of civilized life. Their sorrow is evinced in the most poignant manner by tears and piercing cries; but the storm soon blows over, and their ordinary tone of mind is restored.

Their degraded savage state is strongly evinced by their treatment of the women. Polygamy is admitted according to the means of support of the husband; but it appears the wife is always taken from a tribe different from that of the husband, who, in the exercise of a savage and peculiar custom, steals her by force or address and cunning. Not content, however, with thus separating the woman of his choice, without consulting her inclinations, from all her connexions, she is at first dreadfully beaten and otherwise maltreated in the most savage and barbarous manner; thus stolen and thus initiated, she becomes the wife or rather slave of her cruel husband, and her relations seek no other revenge than by a similar retaliation on the husband's tribe.

They know no civil government, but are subject most completely to the head of each family or tribe, who is arbitrary in his little dominion. Of religious tenets they may be said to be still more destitute, though the voice of nature has made its way even to their untutored minds, and insinuated a vague kind of belief, that they are to go after death over the

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YAÑGO MUNGO YE YANGO or BATHURST'S PLAINS.

NEW HOLLAND.

Lmin. del. M. Griffith sc.

London. Published by B. Whittaker. May. 1824.

great waters or to the clouds. Annihilation, the materialist's creed, is too absurd for the Australasian savage.

In the year 1815, Governor Macquarie and a party left Sydney on an excursion some distance into the interior of New Holland, in order to form a settlement at about 140 miles from Sydney, over a chain of hills called the Blue Mountains. They met many natives who seemed very distinct from the inhabitants in the neighbourhood of the old settlement, and spoke a language perfectly unknown to them. The latter have a great dread of this inland race, and believe them to be anthropophagi, though apparently without reason.

As no figure of these people has been hitherto published, we have inserted the opposite portrait of a young man from a drawing taken by Mr. Lewin, who accompanied the above-mentioned party.

After the first astonishment and alarm which the sight of the Europeans created in these inland Australasians, they very soon cast off all fear, not even carrying their spears with them, but laying them by, persuaded of perfect security.

They were observed to be a degree more advanced towards civilization than their compatriots of the coast, displaying more art in manufacturing their cloaks of skin, which were neatly sewed together with the sinews of the kangaroo and emu, and fancifully marked in the inside with various figures; these cloaks, however, were worn for the sole purpose of protection from the weather, and

not out of any sense of decency, as they were put off or thrown behind when the weather was warm.

An old woman and a boy were observed each to have but one eye, and it was understood, though not with sufficient certainty, to warrant the statement that these people had a custom of mutilating themselves in this way. The practice of their aboriginal neighbours of punching out a front tooth, so minutely described by Colonel Collins, gives a degree of probability to the otherwise almost incredible absurdity of a set of people voluntarily depriving themselves or each other of an eye. Governor Macquarie, however, met with but two instances out of upwards of fifty of these people thus mutilated; but whether they were voluntarily so or by accident, ignorance of their language would not permit the Europeans to ascertain.

The inhabitants of New Zealand, (says Captain Cruise,) are in general tall, active, and well made; their colour is brown, with black hair, sometimes straight, and sometimes curling; and they have very fine teeth. There is a striking difference between the Rungateedas, that is, the chiefs and better class of people, in stature and cast, and those who are by birth *cookees*, or slaves. Many of the latter are almost black, and below the middle size. The New Zealanders exhibit as much variety in features as the Europeans; there is little national character in their countenances, which, before they come to the age for being tattooed, may be called regular and pleasing.

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A HOODEE O GUNNA CHIEF or RANGHEE HOO.

NEW ZEALAND.

Lewis. del. London. Published by B. Whittaker May. 1824.

The lines of the tattooing vary in the different tribes; and when an individual attains his twentieth year, he is considered unmanly if he has not endured part of this painful process, which is renewed at intervals, as the lines become fainter, to the latest period of their lives.

They have made some progress in the arts of life, but are not equal to the natives of the Friendly or Society islands, in those respects. Their notions of religion are rude and imperfect; they believe in a supreme being called the Atua, but also worship (though with no fixed forms) the sun, moon, stars, &c.; they believe in a happy immortality for their chiefs, but deny a future state to their cookees or slaves. They often treat their women with brutality, and the practice of cannibalism is common with them; they possess, notwithstanding, considerable intelligence, and some good moral qualities; but yet we can hardly deem them more than one step beyond the most savage state.

The natives of the Friendly islands have a general resemblance to the New Zealanders, but are more civilized; they are of the ordinary European stature, though some are above six feet; their colour is a deep brown, verging in the better classes to a light olive; their features are various, and many have the true European cast of countenance; their hair is straight, thick, and strong. That they have made some progress in civilization is evident from the fact of their having terms to express numbers to 100,000.

The people of Otaheite, and the Society isles, are the handsomest of the South Seas. The complexion of the higher orders is described as white, tinctured with a brownish yellow; and, in some of the women a blush is clearly distinguishable in the cheek. From this, we find among the lower orders all the intermediate hues down to the deepest brown; black is the usual colour of the hair, and of a fine texture, but brown, red, and flaxen hair has been observed among them; they are of the largest size of Europeans, and well-made; their features are good in general, but the nose is usually somewhat flattish; corpulence is common among them; their language is more harmonious, and their manners more refined than those of any other of the South Sea islanders. The opposite profile of an aged chief of this island is eminently remarkable for its manly beauty.

The people of the Marquesas are considered the finest in the Southern Ocean; and in form are, perhaps, the finest in the world; their average stature is from five feet ten to six feet. The practice of tattooing makes the men appear dark, but the women and children are very fair; their hair, like ours, is of various colours, but red is not found among them.

It is said that the Otaheitan skull approximates to the Negro, while the colour so widely differs; on the contrary, the natives of the Friendly islands, though very dark in colour, have more of the European cast of head and features.

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1. AGED NATIVE OF OTAHEITE.

2. NEW HOLLANDER.

J. Lewin del.

London Published by G.B. Whittaker March 1817.

It is unnecessary to enter into any further details respecting the inhabitants of the South-Sea Islands. It would be but to repeat, with little variation, what has been already said; similar physical characters, in similar degrees of difference or approximation mark them all. Greater or less advancement in civilization is found among them in proportion, as it is said, to their approach to, or divergement from, the Caucasian form. This, however, is a question which should not be too hastily taken for granted. There is a general similitude in their languages, many of which seem only dialects of one and the same tongue; their origin has usually been referred to the peninsula of Malacca; but, from their rude and simple state of society, and the idolatrous character of their religion, Dr. Prichard is inclined to refer the colonization of these islands to a remote period, and to deduce it from an early emigration from India. Indeed, the black races, or Papuas, found, as before stated, in parts of the Indian islands, display no similarity to the Malay people.

In taking a glance at the population of the immense peninsula of Africa, the attention seems first naturally directed to what was once a most magnificent and important, though small, portion of it.

The local situation of ancient Egypt, that great cradle of European civilization and learning, has, probably, induced the opinion, which has been very prevalent, that the enlightened Egyptians were themselves Negroes, or from a Negro race. Physiology has, however, detected this error, for it is

clear, from the examination and comparison of a great many skulls of Egyptian mummies, that these people belonged to the Caucasian division, and that their cranium and brain were very voluminous when compared with the existing African races. The fact is curious, as a collateral evidence of the position that a contrary form of head is incompatible, nationally speaking, with an enlarged mind.

The Abyssinians appear to be a colony of the Arabians.

So much of Africa as is within the torrid zone, is presumed to be in possession partially of the Moors, but very generally of the Negroes. Of this large division of the human race, enough perhaps may already have been said. Whatever individual instances may offer against the position, there seems great reason to conclude that it has pleased the Father of all to assign to these people a lower place in the intellectual scale, compared with others of their fellow men, especially when we advert to the stationary condition of their minds through so many ages. A physical obstacle to their progress seems to be a more natural solution of this problem, than any political or local circumstances we can imagine.

In South Africa there are some varieties of brown or yellowish coloured men. Among these is one, which though at present but little known, offers to our observations, some peculiarities both physical and moral, not less imposing than any already treated on. This unhappy race has been for a long

time confounded with the Hottentots, but is now understood to be distinct both from that people, and the Caffres, and is known by the name of Bushmen, from their habit of living in little other dwellings than woods and bushes, and from which as from a hiding-place, they frequently issue to surprise and plunder any that may approach.

That the Hottentots are distinguished by certain peculiarities before noticed, especially the females, has been repeatedly asserted by travellers and as often denied. Le Vaillant has attributed the peculiarities to which we allude, to a distinct people, whom he names Hozouanas, while Baron insists that no such nation exists. Lichtenstein and Janssens have confirmed the former assertion, and stated positively that the people in question whom they name Bosjesmans are, and ever have been, distinct, having their own peculiar language and customs. No Hottentot, they add, understands a word of the Bushmen's language; and the nation was hated by all others on account of its habits of plunder and disregard of the rights of property, long before Europeans settled in Southern Africa.

These statements as well as those of others who have asserted their personal knowledge of the fact, have been greatly confirmed by the introduction to Europe of two individuals of this degraded race a male and a female. The former, a mere boy, was in Paris in 1807, was very small in stature, and resembled in general appearance his countrywoman. The latter was brought to this country some time

ago, and exhibited here under the name of the Hottentot Venus. She was afterwards taken to Paris, and died there in 1815, and as the Baron Cuvier had the opportunity of examining her both before and after her death, and has published the results in the great work of his brother and M. Geoffrey St. Hilaire on the Mammalia, we shall extract from that work without pursuing the details there given.

But before we enter upon the physical traits, which as they distinguished the above-mentioned individual may be well presumed to be proper to the whole race, it may be useful to refer to their moral condition as displayed in their appearance and modes of life.

In a state of nature these people are said to be filthy beyond conception, having at all times a thick coat of grease and dirt covering their meagre limbs like a rind, which perfectly hides the skin except in a few particular parts where heat and exudation may have melted away this covering and exposed a small part of their swarthy body to observation. Their woolly hair, smeared and matted together with grease and dirt, is tied in knots for convenience which hang round their face and head. Their clothing consists in general, of a sheep or antelope's skin, worn over the shoulders with the woolly side inwards, and tied round the neck with a leather thong: round the middle of the body they tie another skin; and their feet are partly protected by leathern sandals. They wear also a greasy leathern cap, which, together with their necks and wrists

are ornamented, upon occasion when they are rich enough, with beads, bits of metal, *&c.*

They are said to be wantonly cruel and destructive in their predatory excursions, destroying such cattle as they cannot get away, and frequently murdering the Hottentot herdsmen.

Perhaps, however, many of the enormities they commit, both on the Hottentots and Caffres, are rather the result of retaliation and revenge, than the effects of the unexcited impulses of savage ferocity; for it appears that the latter people in particular, pursue them in their woods and hiding-places, and destroy them wherever they are to be found, like wild beasts. Such a desultory mode of warfare might perhaps be warrantable even among those nations who butcher each other in the most refined manner, when the nature and practices of the enemy are adverted to: unorganized by any regular system, it is only in the dark recess, the obscure cave, and the sheltering underwood whence they shoot their poisoned arrows, that they are to be met with individually and opposed. It is therefore more than probable that the poor hunted Bushmen will never advance in the intellectual scale till the prejudices of his fellow men against him have melted away before the beams of charity and reason.

Cuvier observes of the woman before mentioned, that her movements were marked by a quickness and capriciousness which reminded one of those of the monkey tribe. She had moreover a habit of pushing out her lips in the manner of the orang-

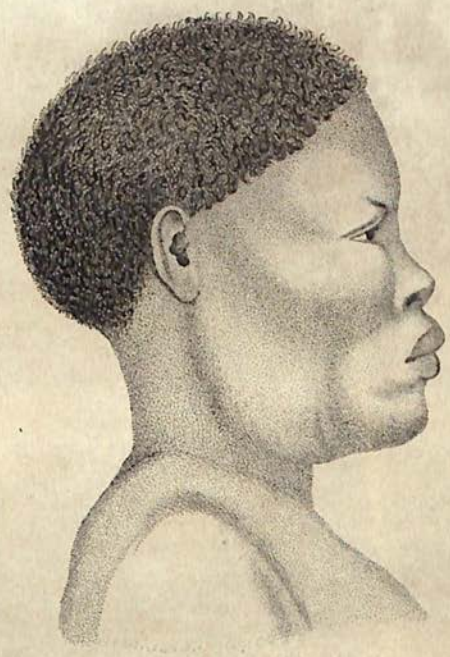
outang. Her disposition was gay, her memory good, and she remembered after several weeks, a person whom she had seen but once: she spoke Dutch tolerably well, which she had acquired at the Cape, knew a little English, and began to speak a few words in French; she danced after the manner of her own country; and shewed some ear for music. Personal ornaments pleased her, but that which flattered her taste more than any thing was brandy, drinking which during her last illness, probably hastened its fatal conclusion.

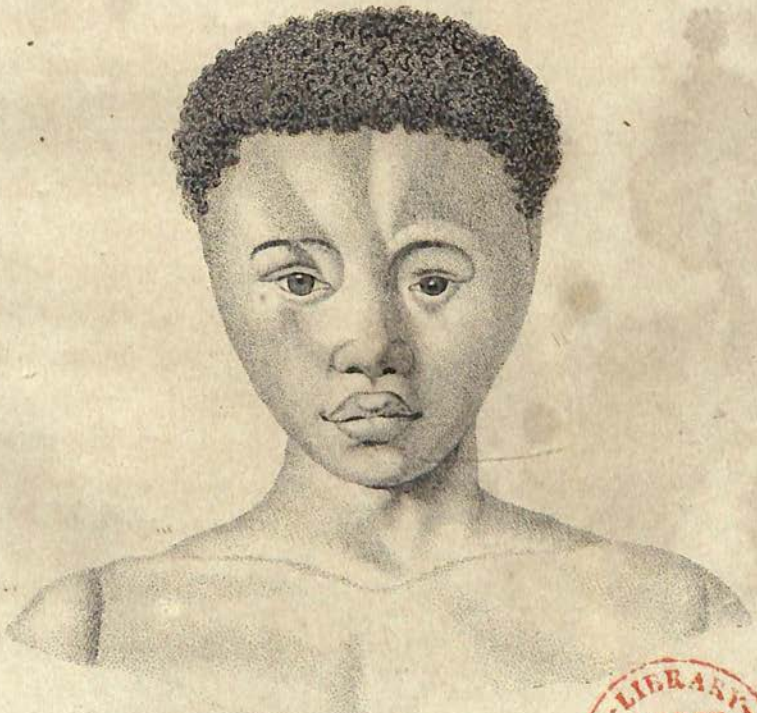
She was five feet six inches in height, which compared with the stature of her countrymen is thought to be tall; this was probably the consequence of her comparatively better living while at the Cape.

The enormous size of her haunches, and the projection of her posteriors were very remarkable. Otherwise there was no deformity in the proportions of her limbs or body: her shoulders, back and upper part of the breast were not devoid of grace: the convexity of the belly was not excessive: her arms were thin: hand and foot well made; but her knees appeared large and clumsy, which was afterwards discovered to be caused by an accumulation of fat there.

The most disgusting part of this woman was her face, which displayed the characters both of the Negro and of the Mongole countenance in its different features.

The posterior protuberance was by no means muscular, but was composed of a mass of an elastic





SOUTH AFRICAN BUSH-WOM

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London Published by G. & W. B. Whittaker May 1824.

and tremulous consistency placed immediately under the skin: it vibrated partially at every movement, and it was evident that excoriations had been formed by the numerous cicatrices which remained.

We may notice a similar peculiarity in the African variety of the sheep, (the ovis laticaudata of Ray;) and another still more exact in the females of some of the most brutal of the monkey tribe, as the Mandril, the Papio, *&c.*, which are said to be subject at certain periods of their lives to corresponding enlargement to a monstrous extent.

This poor woman stated that the enlargement in question did not take place until she approached womanhood, which, as she added, was the case with all her countrywomen. The contrary has been said by travellers, who have affirmed that this peculiarity is proper to them from infancy.

The *femurs*, the *humerus*, and the *omoplate* in the skeleton of this woman, presented some peculiarities of conformation, which Cuvier observes to be analogous to what is met with in the quadrumana. From a single specimen, however, it is hardly safe to affirm that these peculiarities are universal in the Bush race.

The skull presented the comparative characters before mentioned in regard to the physiognomy, in a still more striking manner: The characters of the Negro and those of the Calmuck were alike apparent in different parts. In the obliquity of the facial angle, and enlargement of the face, she ap-

proached the quadrumana, says Cuvier, nearer than any variety of the human species yet observed.

The subjects which, in this brief treatise have been thus transiently noticed involve many points of doubt, and many questions of controversy—some of these research and learning may eventually solve, but there are others altogether out of the reach of man's acquirement: the pride of learning, however, can ill brook apparent defeat, and human wisdom is too prone, in the overweening confidence of its own powers, to take darkness for light, and to admit hypothetical speculation for established certainty.

Hence, perhaps, arises the prevailing error of attributing too much to secondary causes, especially in the phenomena of nature, which may, in general, be found to depend on a series more or less extensive of material agents. When these are traced to the utmost reach of investigation, it is surely the height of absurdity, however common it may be in practice, to forget the dependence of the whole on the first great Cause of all. In the language of the poet:

> This truth, philosophy, though eagle-eyed
> In nature's tendencies, oft overlooks;
> And, having found his instrument, forgets
> Or disregards, or, more presumptuous still,
> Denies the pow'r that wields it. God proclaims
> His hot displeasure against foolish men
> That live an atheist life; involves the heaven

In tempests; quits his grasp upon the winds,
And gives them all their fury; bids a plague
Kindle a fiery bile upon the skin,
And putrefy the breath of blooming health.
He calls for famine; and the meagre fiend
Blows mildew from between his shrivell'd lips
And taints the golden ear: he springs his mines,
And desolates a nation at a blast,
Forth steps the spruce philosopher, and tells
Of homogeneal and discordant springs
And principles; of causes, how they work,
By necessary laws their sure effects,
Of action and re-action. He has found
The source of the disease that nature feels,
And bids the world take heart and banish fear.
Thou fool! will thy discovery of the cause
Suspend th' effect, or heal it? Has not God
Still wrought by means since first he made the world?
And did he not of old employ his means
To drown it? What is his creation less
Than a capacious reservoir of means
Form'd for his use, and ready at his will!
Go dress thine eyes with eye-salve; ask of him,
Or ask of whomsoever he has taught,
And learn, though late, the genuine Cause of al

CLASS

MAMMALIA.

ORDER QUADRUMANA.

In addition to the anatomical characters peculiar to the human species, already detailed in the proper place, the animals now under consideration present a very remarkable difference from man in the conformation of the lower extremities. Each of these possesses a thumb, free and opposable to the other toes—the toes themselves are also long and flexible, and altogether similar to the fingers of the hand. In consequence of this peculiarity all the species of this order exhibit the utmost facility in climbing trees, but cannot sustain themselves, and much less walk unsupported in an erect posture without considerable difficulty; for in this position their foot rests on its outer edge only: their narrow pelvis also is by no means favourable to equilibrium. The intestines of the Quadrumana are similar to man's—their eyes have a horizontal direction—the mammæ are pectoral—the brain has three lobes on each side, the posterior lobe forming a second covering for the cerebellum, and the temporal cavities are separated from the orbit by a bony partition.

In tracing the different species of this order we find that they gradually degenerate from the close

approximation to the human form by which some of them are so strikingly remarkable, exhibit a greater elongation of muzzle, a tail, and a mode of locomotion more quadrupedal; still however the freedom of the arms, and the peculiar formation of the hands in all of these animals, allow of their performing a number of actions and gesticulations similar to those of man.

These animals have for a long time been divided nto two genera, monkeys and lemurs, which by the multiplication of secondary forms have become two small families. Between these a third genus, that of the Ouistitis *, may be placed, as the species included in it cannot conveniently be referred to either of the others.

THE MONKEYS, (*Simia*, Linnæus).

These include all such quadrumanous animals as have four straight incisive teeth in each jaw, and flat nails on all the extremities, two characters which approximate them more closely to the human form than the genera which follow. Their cheek teeth, also, like ours have only blunt tubercles, and they live naturally upon fruits: but their canine teeth, being longer than the others, supply them with a weapon of which we are destitute, and require a vacuum in the opposite jaw to receive them when the mouth is closed.

* *Hapales* Illiger, very small American monkeys, with nails, pointed, arched, and compressed laterally.—Ed.

We may divide the monkeys into two principal sub-genera, *viz.*, 1. monkeys of the old world, and, 2. monkeys of the new, which will naturally be found to form numerous groups.

Monkeys proper to the Old World.

All these have the same number of cheek teeth as ourselves, but in other respects they differ from one another by certain characters, which have given rise o the following sub-divisions.

Apes, Orangs, *or* Wild Men, (*Simia*, Erxleben, *Pithecus*, Geoffr. Illiger.)

The muzzle in these animals is by no means prominent, the facial angle inclining about 65°. These are the only quadrumana in which the hyoid bone, the liver, and the cæcum exactly resemble those parts in man. Some have the arms long enough to touch the ground when they are in an erect posture.

The Orang Outang, (*Simia Satyrus*, Linn.)

The average height of this species is from three to four feet. The body is covered with coarse red hairs. The forehead equals in height one-half of the rest of the visage. The face is bluish. There are neither pouches in the cheeks, nor callosities on the buttocks. The hinder thumbs are

remarkably short. This celebrated ape resembles man more nearly than any other animal in the form of the head and the volume of the brain. The natural history of the Orang Outang has been miserably disfigured by the mixture of it with that of other apes of the larger size, more especially with that of the Chimpansé. Upon a critical examination I have ascertained that he inhabits the most oriental countries only, as Malacca, Cochin China, and particularly the great island of Borneo, whence he has been brought to Europe by way of Java, though but very rarely. He is gentle, easily tamed, and capable of attachment. From the character of his physical conformation he can arrive at some facility in the imitation of several human actions; but his intelligence by no means equals the exaggerated accounts we have received of it, nor does it appear to surpass much that of the canine species. Camper has discovered, and ably described two membranous sacs which communicate with the ventricles of the glottis in this animal, and produce a thickness and hoarseness in the voice; but he was wrong in believing that the nails are always wanting on the hinder thumbs

The Black Gibbon, *(Simia Lar.) Buffon* xiv., ii.

Is covered with coarse and long black hairs. The circle round the face, and also the hands,

are of an ash-colour. It has scarcely any forehead, and the cranium is of a retreating form, more developed in the posterior region. It has slight callosities on the buttocks. This animal inhabits the East Indies.

The Ash-coloured *or* Silvery Gibbon, *also called the* Wou Wou. (*Simia Leucisca*, Schreber, *Molock*, Audebert, *Fam.* i. *sec.* ii. *pl.* ii.)

Like the preceding, but covered with a soft and silvery wool. The face is black. It is common to Java and the Moluccas, where it usually lives among the reeds and climbs upon the highest branches, balancing itself on them by its long arms.

In the other apes, or orangs, the arms descend no farther than the knees, they have no forehead, and the cranium retreats immediately behind the crest of the eyebrows.

The Chimpansé, (*Simia Troglodytes*, Linn.)

Covered with black or brown hairs, less thickly in front. If we can trust to the relations of travellers, this animal approaches or even surpasses the human stature. But we have not yet seen in Europe any specimen confirmatory or even indicative of the truth of this assertion.

It inhabits Guinea and Congo—lives in troops —constructs huts of leaves and branches of trees—arms itself with stones and clubs, and employs them to repulse from its dwelling both elephants and men—pursues and carries off the negro women, *&c.* Naturalists have constantly confounded this animal with the Orang Outang. In a domesticated state it becomes gentle enough to be taught to walk upright, and to sit and eat after our manner.

All the monkeys of our old continent which follow have the liver divided into many lobes; the cæcum large, short, and without appendage; the hyoïd bone, in shape, like a buckler.

The GUENONS, *vulg. Long-Tailed Monkeys. (Cercopithecus, Erxl.)*

The muzzle triflingly prominent; facial angle 60°; cheek pouches; a tail; and callous buttocks. The last molar tooth below has four tubercles, like the others. Their numerous species of every variety of colour and magnitude abound in Africa and India, live in troops, and commit great ravages in the gardens and cultivated fields. They are tamed without much difficulty.

The ENTELLUS, *(Simia Entellus, Dufresne,) Audeb. Fam. IV. sec. II. pl.* 11.

Yellowish white; eye-brows, and four hands, black. This is one of the larger species, and of those which have the longest tail.

The PATAS, or Red Monkey *. *(Simia Rubra, Gm.) Buffon XIV., XXV.,* XXVI.

A reddish fawn-colour, rather lively in the upper parts of the body, whitish below. A black band over the eyes, sometimes surmounted with white. A native of Senegal.

The MANGABEY *with Collar,* or White Eye-lid Monkey. *(Simia Æthiops, L.) Buffon XIV.* XXXIII.

A chocolate-coloured brown above, whitish below, and on the nape of the neck. A sort of coif on the head of a lively red; eye-lids, white.

Buffon says, that this monkey is from Madagascar. Hasselquist declares it Abyssinian. In fact, Sonnerat affirms, that there are no monkeys in Madagascar.

The MANGABEY *without Collar, (Simia Fuliginosa, Geoff.) Buffon XIV.* XXXII.

A chocolate brown, uniform above, pale fawn-coloured below, white eye-lids. Buffon declares this of Madagascar, and believes it a variety of the preceding.

NEGRO-MONKEY, *(Simia Maura, L.) The Adult. Edw.* 311. *The Young. Schreb. XXII.*

Quite black, when full grown; fawn-coloured in

* The English name of the species when it differs from the French will in general be inserted in this manner from Pennant and Shaw, and other writers, though the synonima will frequently be found to differ from such writers.—ED.

youth. M. Léchenaud has caught it several times at Java.

The CALLITRIX, or Green Monkey. *(Simia Sabæa, L. Buffon XIV.* XXXVII.*)*

Greenish above, whitish below; face, black; cheeks, whitish, and tufted. End of the tail yellow. Native of Senegal.

The MALBROUC, *(Simia Faunus, Gm.) Buff. XIV.* XXIX. *Simia cynosuros Scopol. Schreb. var. of the Callithrix Audebert*.*

Greenish above; ash-coloured on the limbs; face, flesh-coloured; no yellow in the tail; a black and white band over the eye-brows. Habitat., according to Buffon, in Bengal. His *talapoin* appears only a young Malbrouc.

The MONA, or varied Monkey. *(Simia Mona. and S. Monacha. Schreb. Buff. XIV.* XXXVI.

Brown body; black limbs; breast, interior of the arms, and circumference of the head, white; black band across the forehead; a white spot on each side of the tail.

The ROLOWAY, Spotted Monkey. *(Simia Diana, L.) Exquima, Margr. Audebert IV. Fam. sect. II. pl. VI. and Buff. Supp. VII.* XX.

Blackish, speckled with white above, white

* The *Cercopithecus Barbatus* of Clusius which Linnæus cites as an example of his Faunus, is rather an Ouanderou than a Malbrouc.

below; the crupper of a purplish red; black face, surrounded with white, and a small whitish beard on the chin.

The MOUSTAC, or Mustache Monkey. *(Simia Cephus, L.) Buff. XIV.* XXXIV.

Ashy-brown; a yellow tuft above each ear; a beard of clear blue, in the form of a reversed Chevron, on the upper lip.

The ASCAGNE, or Vaulting Monkey. *(Simia Petaurista Gm.) Audebert IV. Fam. Sec. II. pl.* XIII.

Olive brown above; grey below; blue face; white nose; white tuft before each ear; black moustache.

The HOCHEUR, or Long-nosed Monkey. *(Simia Nictitans, Gm.) Aud. ib. XIV.*

Brown, marked with small points of white; white nose, in the middle of black visage; round the lips and eyes reddish.

These five last species, are small, beautifully variegated in colour, and of a gentle disposition, and common in Guinea.

There is a large Guenon, which is remarkable from the extraordinary form of the nose, this is

The KAHAU, or Proboscis Monkey. *(Simia Nasica Schreb.) Buff. Suppl. VII.* XI. XII.

Yellow, tinted with red; nose excessively long,

in the form of a sloping spatula. It lives at Borneo in great troops, which assemble morning and evening on the branches of the great trees on the banks of rivers. *Kahau* is its cry. It is also said to belong to Cochin-China.

Another Guenon, fully as large as the last, is distinguished by having no callosities on the posteriors. This is

The Douc, or Cochin-China Monkey. *(Simia Nemæus, L.)* *Buff. XIV.* XLI.

The most agreeably coloured of all the monkeys. Body and arms grey; neck red and black; yellow tufts on each side of the head; black band upon the forehead; thighs, hands, and feet, black; legs red, and a large triangular spot upon the crupper, together with the tail, white. It inhabits also in Cochin-China; *Douc*, or *Dok*, signifies monkey in that country.

The Baboons

Have cheek pouches and callosities like the Guenons, but their muzzle is more salient, and to their last cheek tooth in the under range, there is an additional unequal tubercle. They vary in the length of the tail, and in that of the muzzle. The generality of them are more or less ferocious, and all have a bag which communicates with the larynx, under the tyroid cartilage, and which is filled with air when they cry. We divide them as follows:

The MAGOTS

Have a full and moderately long muzzle. A small tubercle instead of tail.

The MAGOT, or Barbary Ape. *(Simia Sylvanus, Pitheeus and Inuus, Gm. Schr.) Buffon XIV.* VII. VIII *.

Covered altogether with hair, of a clear grayish. Of all the monkeys, it is that which most easily endures our climates; it it an aboriginal of Barbary, from whence it is frequently brought into Europe. It sometimes proves productive in these countries, and has been even naturalized in the least accessible parts of the rock of Gibraltar.

The MACAQUES †

Are distinguished from the Magots by a tail more or less long, and from the cynocephala, because their

* The Pithecus described by Buffon was a young Magot. As to his little Cynocephalus, and the great and little Cynocephalus of Prosper Alpin are nothing else. Πίθηκος is the generic name in Greek for monkeys, and the one of which Galen gives us the anatomy is nothing but a magot, though Camper thought it was an orang-outang, in consequence of not thoroughly comprehending what Galen said respecting the larynx. M. De Blainville, perceived this mistake, and I have established the fact by comparing all that Galen said respecting the anatomy of the Ape with these two species.

† Macaco is the generic name for monkeys on the coast of Guinea, and among the negroes transported to the Colonies. Margrave has noticed one species of them, which he says, has *nates*

nostrils open obliquely on the upper part of the muzzle.

The MANED MACAQUE, or Ouanderou. (*Simia Silenus, et Leonina L. and Gm.*) *Ouanderou of Buff. And. II. Fam. Sect. I. pl.* III.

Black, an ash-coloured mane and white beard, surround the head. It appears that there are some individuals white altogether or in part, and others of various tints of brown or fawn-colour. Habitat. the island of Ceylon.

The CHINESE BONNET *and* CROWNED GUENON, *of Buffon* (*Simia Sinica, Gm.*) *Buffon XIV.* XXX.

A fawn-coloured brown, sufficiently lively above, white underneath, face flesh-coloured, hairs on the top of the head, disposed in radii and forming a sort of hat or bonnet. Native of Bengal and Ceylon.

The EGRET (*Simia Aygula, L.*) *Buffon XIV.* XXI.

Olive-coloured, gray above, paler or more yellow underneath, a bunch of long hairs on the top of the head. Of Africa.

The MACAQUE OF BUFFON, or Hare-lipped Monkey. (*Simia Cynomolgus and Cynocephalus, L.*) *Buffon XIV.* XX.

Greenish above, yellow or whitish below. From

elatas bifidas. These vague words were employed only after him, and remained in the description applied to the Macaque of Buffon, though there was nothing of the kind in the animal.

Guinea and the interior of Africa, whence it is sometimes brought into Egypt.

Two species of Macaques are distinguished by a tail rather short and thin.

The MAIMON. (*Simia Nemestrina, L. et Simia Platypigos, Schr.) Audeb. II. Fam. sect. I. pl.* II. *

Deep brown above, a black band commencing on the head and growing slighter along the back, yellowish round the head and limbs, thin tail, pendant only as far as half the thighs.

The RHESUS. *Aud. Patas à queue courte, ib. pl. IV. ana Buffon Suppl. XIV. pl.* XIV. *The first Maimon represented by Buffon* †.

Grayish, tint of fawn-colour on the head and croupe. Sometimes on the whole back.

The CYNOCEPHALA. (*Cynocephalus, C.*)

Have a muzzle elongated, and as it were, truncated or lopped at the end where is the boring of the nostrils, which gives it the appearance of that of a dog more than in the other quadrumana. Their tail varies in length.

* The only good figure of this animal, is that of Audebert. Buffon's belongs rather to the Rhesus.

† The Macaque à queue courte of Buffon (Simia erythrea, Schr.) seems to me a true macaque (cynomolgos) whose tail was cut. Audebert is wrong in confounding it with his Rhesus, which is the Patas à queue courte of Buffon.

The PAPION, or common Baboon. *(Simia Sphynx.)*

Of a yellowish green, trenching more or less on brown. Black visage, long tail*. They are found of various sizes, which in all probability result from the differences of age. When adult, this animal is most ferocious and disgusting. A native of Guinea.

The BLACK PAPION. *(Simia Porcaria, Bodd. Ursina, Penn. Sphyngiola, Uerm. La guenon à face allongée, Penn. and Buff. Supp. VII. pl.* XV. *Singe noir de Vaillant*†.)

Black, fronted over with yellow or greenish, particularly in the forehead. In form and manners like the preceding. From the Cape.

The TARTARIN *of* BELON, *or* PAPION, *à perruque. (Simia Hamadryas,* Linn. DOG-FACED BABOON *of* PENNANT. *Singe de Moco. Buffon. Supple. VII.,* X.)

Of an ash-colour, somewhat bluish. Hairs of the Ruff, and above all, those of the sides of the head, very long: face flesh-coloured. This large baboon is also one of the most disgusting, and horribly ferocious. It is peculiar to Arabia.

* Those which have been represented with short tails, had the tail cut, as the Papions of Buffon.

† All these factitious species are founded on the variations of health or age in the individuals.

The SHORT-TAILED PAPION. *(Simia Syvlestris Schreb.* BABOON *of the* WOODS. *Penn. Simia Leucophæa. Fred. Cuvier. Ann. du Mus. d'hist. natur.)*

Clear yellowish gray: black face. Tail very short and slender.

The MANDRILLS,

Of all the monkeys are those which have the longest muzzle. The tail is very short. They are also extremely brutal and ferocious. Only one species is known.

The MANDRILL. *Boggo. Choras. Buff. XIV.*, XVI., XVII., *and Suppl. VII.* IX. *(Simia Maimon et Mormon,* Linn.)

Grayish brown, inclining to olive above. Small beard of a citron yellow on the chin. Cheeks blue and furrowed. In the adult males the nose grows red, especially towards the end, where it becomes a bright scarlet. Those have been wrongly supposed a distinct species *. The genital parts and round of the arms have the same colour. The buttocks are of a beautiful violet. It is not possible to conceive an animal more extraordinary and more hideous.

* I have myself seen, as well as M. Geoffroy, two or three Mandrills or Sim. Maimon, change into the Choras or S. Mormon, in the menagerie of the Museum. The bunch of hair which is added as a character of the Mormon, is also frequently found in the Maimon.

He very nearly attains the height of man. The negroes of Guinea are much afraid of him. Many traits of his history have been mixed with that of the Chimpansé, and of course, with that of the Orang-Outang.

The PONGOS

Have the long arms and the absence of tail peculiar to the Orang-Outangs, with the cheek-pouches of the Guenons and Baboons, and a form of head altogether peculiar. The forehead retreats considerably, and the cranium is small and compressed. The face is of a pyramidal form, in consequence of the elevation of the mounting branches of the lower jaw, which indicates in the organs of the voice some disposition analogous to that which has been observed in the howling monkeys of America. We know already, that they have a membranous pouch adhering to the larynx, like the baboons.

As yet but one species is known, which is the largest of the monkey tribe, and one of the most formidable of animals. It is brown, with face and hands black, and inhabits the island of Borneo. Many traits of its history have doubtless been min-

* The name Pongo, corrupted from that of Boggo, which in Africa is given to the Chimpansé, or to the Mandrill, has been applied by Buffon to a large species of Orang-Outang, which never existed but in his own imagination. Wurmb has transferred it to the animal described above, which he was the first to describe, and of which Buffon had no idea. Mem. de la Soc. de Batavia, tom. II. p. 245.

gled with that of the Orang-Outang, inasmuch as the length of its arms, that of the spinal apophyses of the cervical vertebræ, the tuberosity of its calcaneum may facilitate for it the vertical position. Its height is nearly that of man. Its skeleton is represented in Audebert, vol. II. f. 8.

The Sapajous, or Monkeys of America,

Have four cheek-teeth more than the other monkeys, thirty-six teeth in all, long tail, no cheek-pouches, hairy buttocks, and without callosities, the opening or piercing of the nostrils at the sides of the nose and not underneath. All the large quadrumana of the new world belong to this division. The large intestines are less inflated, and the cæcum longer and narrower than in the preceding species.

Some have prehensile tails, that is, their extremity is capable of being twisted round a body with sufficient force to grasp it like a hand. These last, more especially retain the name of Sapajous, (Cebus, Erxleben.)

At their head may be placed the Alouattes (Mycetes Illiger) or howling monkeys, which are distinguished by a pyramidal head, the upper jaw of which descend much below the cranium. The lower jaw has its ascending branches very high, for the purpose of lodging a bony drum or barrel, formed by an inflation of the hyoïd bone which communicates with the larynx and gives to the voice of these animals an enormous volume and frightful sound. Thence comes their

name of *howling* monkeys. The prehensile part of their tail is naked and callous underneath.

The COMMON ALOUATTE, *Simia Seniculus,) (vulg. Red Howling Monkey,) Buff. Sup. VII. XXV.*

Inhabits the woods of Guiana where they live in troops. About the size of a strong fox. A reddish maronne colour, rather lively.

THE OUARINA, (*Simia Beelzebut*, L*.) *vulg. Brown Howler, Caraya of Azzara, Guariba of Margr.*

Common to Brazil and Paraguay. The male is black above, red below. The female brownish.

The COMMON SAPAJOUS

Have the head very flat and the muzzle not prominent. (Facial angle, 60°.) There are some of these whose thumbs of the forehand are concealed under the skin, and the prehensile part of the tail naked underneath. Mr. Geoffroy makes a genus of them under the name ATELES. The first species, the *Chamek (Ateles pentadactylus*, Geoff.) differs from the others in having the thumb more projecting, though it consists but of a single phalanx, and without a nail. The lower jaw is also as high as that of the Alouattes, and the hyoïd bone extremely similar to theirs. The hair is altogether black.

* The Beelzebut of Brisson is a Coaïta.

The COAITA, *(Simia Paniscus,* L.) *Buff. XV.* I.

Covered altogether with black hair like the Chamek, but without any visible thumb.

The COAITA *with bordered face, (Ateles Marginatus, Geoff.) Ann. Mus. XIII. pl.* X.

Black, a border of white hairs round the face.

The white-bellied COAITA, *(Sim. Beelzebut. Briss. Geoff.) Ann. Mus. VII. pl.* XVI.

Black above, white underneath. The circumference of the eyes flesh-coloured.

The fawn-coloured COAITA, *(Ateles Arachnoides, Geoff.) Ann. Mus. XIII. pl.* XX.

Fawn-coloured, or red.

All these animals come from Guiana or Brazil. Their fore-feet are extremely long, and very slender, and their entire gait remarkably slow *.

The other Sapajous (Cebus. Geoff.) have distinct thumbs, and the tail altogether covered with hair though prehensile.

The SAJOU, (*Simia Apella.* L.) *and the Saï* (*Simia Capucina.* L.) *Buff. XV.* IV. V. *and VIII.* IX.

Both of different browns. The first has the circumference of the face blackish, the other

* They exhibit some remarkable resemblances to man in the muscular system. They alone of all animals have the biceps of he thigh, formed like ours.

whitish. But all the other shades of their bodies vary between a brownish-black and fawn colour, and sometimes a whitish colour; the region of the shoulders, and of the breast is, however, generally more pale, and the cap or coif, and hands of a deeper colour.

The HORNED SAJOU, (*Simia fatuellus*) *Buff. Suppl. VII.* XXIX.

Is only distinguished by a small crest of hairs on each side of the forehead.

All these animals come from South America. Their disposition is mild, their motions light and lively. They are easily tamed. Their little soft cry has occasioned them to receive the name of Weeping Monkeys. In some of these (*the Callitrix, Geoff.*) the tail almost seems to be prehensile.

The SAIMIRI, (*Simia Sciurea*) *Buff. XV.* X.

Is one of these last; as large as a squirrel, of a greyish yellow. The fore-arms, the legs, and the four hands, yellowish fawn-colour. The termination of the muzzle quite black.

Those which have no prehensile tails are called Sakis. Their tails are generally tufted, which causes them also to be named fox-tailed monkeys. These are the PITHECIA of Desmarest and *Illiger* *.

* In Buffon they are called in common with the Ouistitis, Sagoins (*Callitrix* Erx.) This name of Sagoin or Cagui, belongs, in fact, in Brazil, to all the small quadrumana without prehensile tails. M. Geoffroy

THE WHITE THROATED SAI.

London. Published by George B. Whittaker May. 1824.

The YARKE, *(Simia Pithecia,* L.*) Buff. XV.* XII.

Blackish, circumference of the face white.

The Black SAKI, *(Simia Satanas, Hoffmansegg.) Humb. Zool. Obs.* L. XXVII.

Altogether black.

The RED-BELLIED SAKI, *or Night Monkey, (Pithecia rufiventris, Geoff.) Buff. Suppl. VII.* XXXI.

Brown with red belly.

There are a few of these whose tail is remarkably slender. All come from Guiana or Brazil.

THE OUISTITIS,

(Hapales. Illiger. Arctopithecus, Geoff.)

A small genus like the Sakis, and for a long time confounded with them. They have in fact, like the American monkeys in general, a round head, flat face, lateral nostrils, having buttocks and no cheek-pouches, and, like the Sakis in particular, no prehensile tail. But they have only twenty cheek teeth, like the monkeys of the old continent. All their nails are compressed and pointed except those of the hinder thumbs, and the forethumbs are separated so triflingly from the other

M. Geoffroy gives to his callitrix, to the aotus and pithecia the common name of geopithecus. M. De Humboldt has given, Obs. Zool. I. the figure of a very singular quadrumanum which he calls the night monkey (Aotus. Illig.) but I cannot fix his place, not having seen the cranium or teeth.

fingers, that it is not without some hesitation that we give them the appellation of quadrumana. They are all little animals of an agreeable form, and easily tamed.

The COMMON OUISTITI, (*Simia Jacchus*, L.) *Tit in Paraguay*, *Buff. XV.* XIV.

Tail tolerably tufted and coloured by rings of brown and white. Body grayish brown, two great tufts of white hair before the ears. Found throughout almost all South America.

The PINCHE, (*Simia ædipus*, L.) *Buff. XV.* XVII.

Gray long white hairs on the head, pendent behind the ears, tail slender and red. Found on the banks of the river of Amazons.

The TAMARIN, (*Simia Midas*, L.) *Buff. XV.* XIII.

Black, four hands yellowish. Of Guiana.

The BLACK TAMARIN, (*Midas Ursulus*, *Geoff.*) *Buff. Sup. VII.* XXXII.

Altogether black.

The MARIKINA, (*Simia Rosalia*, L.) *vulg. Lion Monkey. Buff. XIV.* XVI.

Whitish, head surrounded with a yellow mane, tail brown at the end. Surinam.

LIBRARY OF THE ROYAL ASIATIC

THE PINCHE OR RED TAILED MONKEY.

London. Published by Sharpe & Whittaker, May 1824.

M. Griffith

The Mico, (*Simia Argentata*, L.) *Buff. XV.* XVIII.

Silvery grayish white, sometimes white altogether. Tail brown. From the river of Amazons.

THE LEMURS

Comprehend, according to Linnæus, all the quadrumana which have in either jaw, the number of incisives different from four, or at least differently directed than in the monkeys. This negative character cannot fail to include very different beings, and does not even combine all that ought to be united. M. Geoffroy has established in this genus several divisions better characterized, of which we adopt the following:

The Makis, *or* Lemurs *proper*,

Have six teeth below, compressed closely and leaning forwards, four above, straight, and the intermediate ones separated one from the other. Long canines, cheek-teeth of monkeys, a long tail, a pointed nail on the index of the hind hand only, all the rest flat. They are extremely agile animals, and have received the name of fox-headed monkeys, on account of their pointed muzzle. They live on fruits. The species are numerous, and their only habitat is the island of Madagascar, where they seem to occupy the place of the monkeys, which are not found in that region. These species differ little from each other except in colour.

The Mococo, (*Lemur Catta*, L.) *Buff. XIII.* XXII.

Ash-coloured gray. Tail ringed with black and white.

The VARI, (*Lemur Macaco*, L.) *Buff. XIII.* XXVII.

Varied by large spots of black and white.

The RED LEMUR, (*Lemur ruber, Peron.*)

A lively reddish maronne. The head, fore hands, tail, and belly, black. A white spot on the nape of the neck, a red tuft on each ear.

The MONGOUS, (*Lemur Mongos*, L.) *Buff. XIII.* XXVI.

All brown, the face and hands black. There are other species or varieties akin to this, such as

The MONGOUS, *with white forehead*, (*Lemur Albifrons, Geoff.*) *Audeb. Makis, pl.* III.

Brown, white forehead, *&c.*

The INDRIS, (Lichanotus Illig.)

Teeth like the preceding, excepting that they have only four below. The nails the same. No tail.

There is but one species of these known without a tail. About three feet and upwards in height, black, with grayish face and white posteriors. (Lemur Indri) Sonnerat. II. voy. pl. LXXXVI. These are tamed by the inhabitants of Madagascar and trained like dogs for the chase.

The LORIS, *commonly, Lazy Monkeys,* (*Stenops, Illig.*)

The teeth and nails of the Makis, the points of the jaw-teeth sharper. The short muzzle of a young dog, the body slender, and no tail.

They feed on insects, and sometimes on the smaller birds and quadrupeds. They walk with most extreme slowness. Their mode of life is nocturnal. Mr. Carlisle has found in them, at the base of the arteries of the limbs, the same division into little branches, as in the genuine sloth.

But two species are known, both belonging to the East Indies.

The SLOW LORIS, *or Sloth of Bengal,* (*Lemur tardigradus,* L. *Buff.*) *Suppl. VII.* XXXVI.

Fawn-coloured gray. Brown streak along the back. Two incisors sometimes wanting above.

The SLENDER LORIS, (*Lemur gracilis*) *Buff. XIII.* XXX. *and better. Seb. I.* XLVII.

Fawn-coloured gray, without the dorsal streak; a little smaller than the preceding, with nose more raised by a projection of the intermaxillaries.

The GALAGOS, (Geoff. Otolicnus, Illig)

Have the nails, the teeth and the insectivorous regimen of the preceding lemurs. Elongated tarsi which give to their hind feet a disproportioned dimension. A long tufted tail, large membranous

ears, and great eyes which indicate nocturnal habits

Several species of these are known, all African Another African animal seems proper to be referred to this species. (*Lemur Potto.* Gru.) Bosman. voy. en Guin. p. 252, No. 4., to which a slowness is attributed comparable to that of the Loris or Sloths.

The TARSIERS, (Tarsius)

Have the elongated Tarsi, and all the other details of form peculiar to the preceding sub-genus. But the interval between the molars and incisives, is filled by several short canini. The incisives are four in number above and two only below. These are also nocturnal animals and live on insects. They come from the Moluccas. (Lemur Spectrum, Pall.) Buff. XIII. IX.†

* The great Galago as large as a hare (*Galago, crassicaudatus*, Geoff.) the middling of the size of a rat, (*Galago Senegalensis*, id.) Schreb. XXXVIII. Bb. Aud. Gal. pl. J. The little, still smaller. Brown ill. 44. Compare also the Galago of *Demidof* Fischer. Mem. des. natr. de Moscou. I. pl. I.

† Compare the *Tarsius fuscomanus.* Fischer. Anat. des Makis, pl. III.

N.B. Travellers should seek out certain animals drawn by Commerson, and engraved by direction of M. Geoff. Ann. Mus. XIX. x. under the name of *cheirogaleus.* These figures seem to announce a new genus or sub-genus of quadrumana.

SUPPLEMENT ON THE QUADRUMANA.

The reader must have perceived by this time the truth of our observation relative to the "Règne Animal" of Cuvier,—namely, that it is little else than a zoological catalogue arranged on peculiar scientific principles, and that considered as a natural history, it is meagre in the extreme. We do not intend by this remark to cast any reflection on our author, who cannot be made responsible for any thing more than the fulfilment of his original intention; but it is incumbent upon us, not to supply the deficiencies of Cuvier, for properly speaking there are none, but to fill up in the best manner we are able, the outline which he has sketched with a master's hand. Willing, however, that the reader should be in complete possession of this outline, we have determined to keep the translation of the original and our own additional matter and reflections altogether separate: a plan which, though most evidently calculated to secure satisfaction to the reader, involves in the execution no small degree of difficulty to the writer.

The part assigned to every animated being on the great theatre of the universe, however humble, however subordinate, affords a theme of instruction and reflection to the thinking and philosophic mind, and when viewed in conjunction with the anatomical peculiarities of the species, while it exhibits the harmonious adaptation of means to ends, displays also the contrivance, wisdom, and power of the Creator.

Fully to profit, therefore, by the study of zoology, animal biography and comparative anatomy must accompany each other. The key to the latter is systematic arrangement, and to this, in his 'Regne Animal' at least, has Cuvier confined himself. The former, in a comprehensive and com-

pressed form, constitutes the subject of these our supplementary essays, with which, in relation to the Quadrumana, we shall now proceed.

There are few departments of human knowledge that have been more disfigured by fable, imposture, misconception, and exaggeration than natural history in general. Few portions of natural history have suffered more from the same causes than that which relates to the quadrumanous species of the animal world; and the first subdivision of those animals, namely, that of the apes, has proved in a more especial manner a fertile source of falsehood and misrepresentation—of impudent or ignorant distortion of facts, and of ridiculous and contemptible absurdity of deduction.

Man has not merely been placed by his Maker at the head of the countless organized beings which occupy this nether world, but he has also been disjointed, as it were, and severed from them all. His natural superiority is strongly marked, even in the earliest stages of moral advancement, and when his unexcited faculties lie almost dormant within him. Attitude, physiognomy, and language proclaim the rudest savage that traverses the wild, to be lord of the prone and mute creation that surrounds him. But when by the judicious cultivation of his moral and intellectual faculties, the diviner part of man's nature becomes fully developed, we then see clearly and palpably that the gulf which separates him from other creatures is utterly impassable. It matters not how nearly they may approximate to his outward form or his physical peculiarities, his mental powers set him at an immeasurable and inaccessible height above them all. This supremacy is no usurpation of pride; it is the gift of Heaven, and has been universally recognised in all ages and among all nations. The most untaught have yet learned to know and to respect the dignity of their nature,

"To venerate themselves as men."

It has been left to modern sophists alone to doubt of this superiority, to asperse the goodness of nature, and to deny the birth-right of mankind. Such reasoners have not scrupled to disclaim the privileges of men, and to put themselves, and their fellow-creatures on a level with the brutes. Some, indeed, in advancing such degrading paradoxes are worthy only of compassion as the pitiable victims of the grossest error. But there are others who wilfully renounce their reason or pervert the truth, and induced either by that love of notoriety, which would grasp at fame though coupled with obloquy, or by the morbid influence of infidelity, debase mankind to the level of the brute, only to fit them for a similar destiny, assuming annihilation, the atheist's heaven, to be the lot of all.

The singular order of animals before us have furnished a powerful "point d'appui," to such sophistical reasoners. It is, therefore, the more necessary carefully to investigate, and accurately to determine the nature of the anthropomorphous tribes, which according to these sages are our rivals now, and may hereafter become our masters.

Fortunately for truth, men eminent in science and true philosophy have taken up the cause of their insulted species. They have scrutinized with the utmost attention the physical conformation as well as the mental capacity on which the pretended affinity between the human and the monkey races was founded. By assigning to the ape its legitimate position among organized beings, they have successfully refuted this libel upon man, and satisfactorily exposed the injury he received.

Buffon has observed on this subject, "that the ape has all the *masque* of the human figure—that he is an animal man cannot behold without looking in upon himself, and recognising his own nature—without being convinced that body is not his most essential part, and that with the

exception of mind, there is nothing wanting in the ape which we possess." This illustrious naturalist was far from desiring to degrade the species of which he himself was one of the brightest ornaments; but he wrote without those advantages of accurate observation and strict anatomical investigation which have since his time thrown so much light on the subject.

There are peculiarities in the physical structure of man, which seem to be exclusively subservient to his moral endowments. How very imperfectly, for instance, would the faculties of man avail him if he were not constructed for an erect position, if his hands were not at liberty and always at the command of his will! How very limited and local would be his species, were he not endowed physically and morally with a sort of terrestrial ubiquity—to effect which an omnivorous faculty must concur with other circumstances! And again, how impossible would be the complete development of his faculties without the power of speech! When these points are but adverted to, the consequences of each of them rush upon the mind and need no dilatation to point them out.

These points, it must be remembered, necessitate several contingencies in the physical structure of man, and such contingencies are accordingly found in him having reference to no other end: but are they found in the ape?—no. Were they necessary to the development of the mental faculties of the ape?—no. In these, therefore, and in such like particulars of mechanical structure as have a direct or remote reference to the employment of mind, the ape is perhaps as far removed from us in material formation as any other of the class.

The occipital foramen in the apes is placed farther back than in man, consequently when they stand perfectly erect, the head is no longer in equilibrio, and the eyes are directed

upwards; but when the body is in a diagonal direction, its most ordinary position on the branches of trees, which seem hence, and are found accordingly to be the natural and proper habitation of these animals, the eyes have then an horizontal direction. The body is equally unfitted with the head for the vertical position of the animal. The pelvis has its plane of entrance parallel with the spine, and too narrow to furnish a basis of support or equal points of articulation to the limbs; the body cannot, therefore, without violence, remain in a perpendicular posture. The lower extremities still more decidedly negative the erect position. The hands or feet do not rest on an entire sole but on the exterior edge only, thus presenting no proper surface of rest for the frame. The groove of the femur into which the rotula slides, when we extend our legs, is so short in these animals, and the flexor-muscles are inserted so low, that they always have the knees half bent. The muscular calves and buttocks also necessary to the erect position of the legs, are wanting. The forest, therefore, is the natural domicile of these animals in common with all other monkeys, and when necessity or inclination brings them to the ground their locomotion upon it is quadrupedal.

Few animals are more strictly and narrowly located than the apes, as their rarity in this part of the world, even under all the care and artificial means we can employ for their preservation, sufficiently testifies; indeed they seem rigorously excluded from such powers of body as enable man to establish himself every where.

The larynx of the apes can articulate no sound, the air having to fill two considerable cavities placed in the front part of the neck, and communicating with the trachea, before it can pass through the glottis. Here then we seem to observe a complete bar against the invaluable prerogative of speech, though it seems certain at the same time, that no such material obstacle was absolutely necessary in an

animal which displays no capability of that consecutive train of thought which presupposes the power of speech.

It may be sufficient in a general treatise like the present, to advert only to the above points of material conformation, in which the apes differ from mankind, without descending to the minutiæ of anatomical detail, not unmindful that the particular points noticed, have decided and direct reference in man to the employment of his immaterial faculty.

It seems uncertain whether the ancients were acquainted with these animals. Galen observed in what he called the *Pithecus*, a double opening in the cavity of the larynx. This is a character peculiar we believe to the orange, and the notice of it would seem to argue an acquaintance with them. But as the other particulars remarked by Galen will not apply, it appears impossible to decide exactly what animal he meant. It is not improbable that what we have taken for the pithecus of the ancients is no other than the cynocephalus of antiquity.

We may remark how widely different were the sentiments of these ancient philosophers on the subject, from those of the modern sages, to whom we have alluded. In the perusal of their writings we find no cause to blush for the degradation of human nature, or the humiliation of human reason. In the pithecus, notwithstanding his gross and clumsy approximation to the human figure, they saw nothing but the mere animal, destitute of the rational and reflective faculty. The limited extent of their geographical knowledge, and their inaccurate information concerning remote and barbarous tribes, led them, it is true, to suppose varieties of the human species which had no existence. Thus we find mention among them of Satyrs, of Pigmies, of Centaurs, of "men whose heads do grow beneath their shoulders." These their philosophers referred to races of mankind little known, or they rejected as the inventions of fabulists and poets—but in the quadrumana which they had

seen and examined they found neither identity nor affinity with themselves.

It would seem reasonable to believe, after the lapse of ages, that the progress of science and information of every kind, and the increased facility of communication with distant countries, would have imparted some degree of caution and accuracy to the reports of travellers, and set some bounds to the extravagance of their fancy. At least we should have supposed that professed naturalists, that men of science and learning, would not have swallowed such inconsistent and nonsensical fables with the indiscriminating appetite of infantine credulity. But the fact is otherwise—men not merely illiterate and unscientific, but apparently devoid of the use of reason, and the faculty of observation, have accidentally beheld in their rapid journeys some few of these animals called apes. They have mingled in their accounts the credulity of the natives of those countries where they are indigenous with their own fantasies and falsehoods. Thus we have descriptions of men with long tails, covered with yellowish hair, navigating the ocean in boats and bartering parrots in exchange for iron. Others have discovered long-armed men, covered also with hair, traversing the country by night, robbing without discrimination, and speaking a hissing language peculiar to themselves, and unintelligible to us. Bontius, a grave physician, gives us a long and laboured description of a female ape, and adorns the object of his admiration with all the modesty and virtue of the sex. If these animals do not speak, it is only through discretion, and from a well-grounded fear of being forced to labour, should they be foolish enough to display the full extent of their capacity. Gassendi assures us that the ape called Barris is a miracle of judgment—that when he is once drest, he walks upright ever after, and that he learns to play on the flute and guitar with the utmost facility. Maupertuis would prefer

few hours' conversation with the men with tails to the intercourse of the most brilliant wits of Europe. Even Linnæus presents us with a homo troglodytes who shares with us in all the boasted privileges of humanity, and will one day wrest from our monopolizing hands the empire of the world.

But these wonderful wild men of the woods have lost much of their marvellous character when subjected to the examination of attentive and judicious naturalists. On careful observation of his habits and actions, we find that the ape so far from equalling man, is by no means in the first rank among the lower animals for intelligence and docility. The individuals observed upon were all, it must be remembered, young animals. They performed, it is true, certain actions at the bidding of their keeper, to which they had been trained by gentleness or force, but a number of other animals do the same, and if the performances of the ape in this way, as well as its natural and unforced actions, seem more imposing, it results from his general approximation, particularly in the bones, to the human figure. The actions of a well-trained dog or of an elephant are in reality much more intellectual and wonderful. They discover much more sagacity, and are performed by animals very differently provided in mechanical facilities resulting from peculiarity of structure.

We shall proceed with a few observations on each of the several species mentioned by Cuvier in the text, and add thereto some notices of others which belong to this subdivision and are not described by him.

The Orang Outang, which besides its Linnæan synonym was called Jocko, by Buffon, is the homo sylvestris of Edwards, and has been designated by various barbarous appellatives not necessary to be noticed, is of the average height mentioned in the text (three to four feet French). It must be remembered, however, that all the individuals of this

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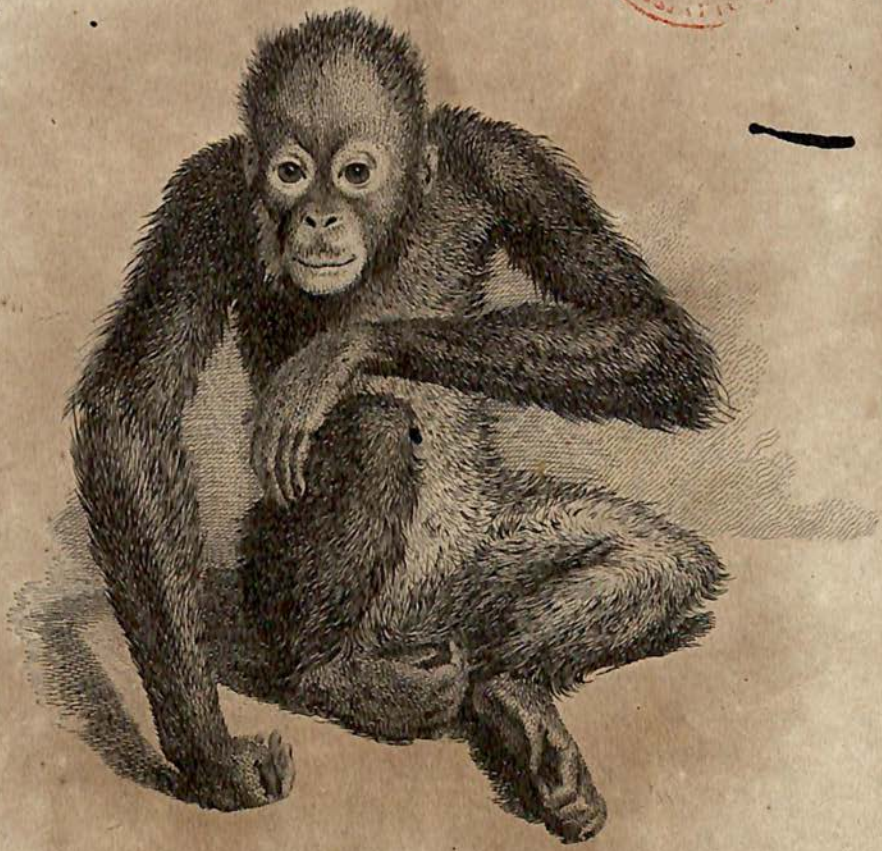

Drawn and Etched by The. Landseer 1824.

THE ORANG OUTANG.

London, Published by ... 1 Augt 1824.

species which have been seen in Europe were young. The stature of the animal when adult is uncertain.

Camper observes of an Orang Outang which he had dissected, that the rotulæ and some other parts were still cartilaginous. This individual he consequently thinks had not attained above two thirds of its height, of which however he seems to believe that four feet would be the maximum.

We are in possession of some very minute and laboured descriptions of this animal, especially by M. F. Cuvier, Professor Camper, Tilesius, and Dr. Abel. The last we shall present to the reader in the author's own words, as scientific, useful, and highly interesting.

The great toes or thumbs of the hinder hands appear to have no nail and but one joint, but this fact has been questioned by Tilesius and Cuvier as characteristic of the animal. The specimen brought from Java by Dr. Abel, from which the following description was written, was marked by this peculiarity, and the Doctor mentions nine similar instances. On the other hand, there appear to be but two cited to the contrary, one by F. Cuvier and the other by Tilesius.

"The hair of the Orang Outang is of a brownish red colour, and covers his back, arms, legs, and outside of his hands and feet. On the back it is in some places six inches long, and on his arms five. It is thinly scattered over the back of his hands and feet, and is very short. It is directed downwards on the back, upper arm, and legs, and upwards on the fore-arm. The face has no hair except on its sides, somewhat in the manner of whiskers, and a very thin beard. The shoulders, elbows, and knees, have fewer hairs than other parts of the arms and legs. The palms of the hands and feet are quite naked.

"The prevailing colour of the animal's skin, when naked, or seen through the hair, is a bluish gray.

"The head, viewed in front, is pear-shaped, expanding from the chin upwards, the cranium being much the larger end. The eyes are close together, of an oval form, and dark brown colour. The eye-lids are fringed with lashes, and the lower ones are saccular and wrinkled. The nose is confluent with the face, except at the nostrils, which are but little elevated: their openings are narrow and oblique. The mouth is very projecting, and of a roundish mammillary form. Its opening is large, but when closed is marked by little more than a narrow seam. The lips are very narrow, and scarcely perceptible when the mouth is shut. The chin projects less than the mouth: below it, a pendulous membrane gives the appearance of a double chin, and swells out when the animal is angry or much pleased. Each of the jaws contains twelve teeth; namely, four incisive teeth, the two middle ones of the upper jaw being twice the width of the lateral; two canine, and six double teeth. The ears are small, closely resembling the human ear, and have their lower margins in the same line with the external angles of the eyes.

"The chest is wide compared with the pelvis: the belly is very protuberant. The arms are long in proportion to the height of the animal, their span measuring full four feet seven inches and a half. The legs are short compared with the arms.

"The hands are long, compared with their width, and with the human hand. The fingers are small and tapering: the thumb is very short, scarcely reaching the first joint of the fore finger. All the fingers have very perfect nails, of a blackish colour, and oval form, and exactly terminating with the extremities of the fingers. The feet are long, and resemble hands, in the palms, and in having fingers rather than toes, but have heels resembling the human. The great toes are very short, are set on at right angles to the feet close to the heel, and are entirely without nails.

"The Orang Outang of Borneo is utterly incapable of walking in a perfectly erect posture. He betrays this in his whole exterior conformation, and never wilfully attempts to counteract its tendency. His head leaning forward, and forming a considerable angle with the back, throws the centre of gravity so far beyond the perpendicular, that his arms, like the fore legs of other animals, are required to support the body. So difficult, indeed, is it for him to keep the upright position for a few seconds, under the direction of his keeper, that he is obliged, in the performance of his task, to raise his arms above his head, and throw them behind him, to keep his balance. His progressive motion on a flat surface is accomplished by placing his bent fists upon the ground, and drawing his body between his arms: moving in this manner, he strongly resembles a person decrepit in the legs, supported on stilts. In a state of nature he probably seldom moves along the ground; his whole external configuration showing his fitness for climbing trees, and clinging to their branches. The length and pliability of his fingers and toes enable him to grasp with facility and steadiness, and the force of his muscles empowers him to support his body for a great length of time by one hand or foot. He can thus pass from one fixed object to another, at the distance of his span from each other, and can obviously pass from one branch of a tree to another, through a much greater interval. In sitting on a flat surface, this animal turns his legs under him. In sitting on the branch of a tree, or on a rope, he rests on his heels, his body leaning forward against his thighs. This animal uses his hands like others of the monkey tribe."

The individual described by the Doctor, "on his arrival in Java from Batavia, was allowed to be entirely at liberty, till within a day or two of being put on board the Cæsar to be conveyed to England; and whilst at large made no attempt to

escape; but became violent when put into a large railed bamboo cage for the purpose of being conveyed from the island. As soon as he felt himself in confinement, he took the rails of the cage into his hands, and shaking them violently endeavoured to break them in pieces; but finding that they did not yield generally, he tried them separately; and, having discovered one weaker than the rest, worked at it constantly till he had broken it, and made his escape. On board ship an attempt being made to secure him by a chain tied to a strong staple, he instantly unfastened it, and ran off with the chain dragging behind; but finding himself embarrassed by its length, he coiled it once or twice, and threw it over his shoulder. This feat he often repeated; and when he found that it would not remain on his shoulder, he took it into his mouth.

"After several abortive attempts to secure him more effectually, he was allowed to wander freely about the ship, and soon became familiar with the sailors, and surpassed them in agility. They often chased him about the rigging, and gave him frequent opportunities of displaying his adroitness in managing an escape. On first starting, he would endeavour to outstrip his pursuers by mere speed; but when much pressed, eluded them by seizing a loose rope, and swinging out of their reach. At other times, he would patiently wait on the shrouds, or at the mast-head, till his pursuers almost touched him, and then suddenly lower himself to the deck by any rope that was near him, or bound along the main-stay from one mast to the other, swinging by his hands, and moving them one over the other. The men would often shake the ropes by which he clung with so much violence, as to make me fear his falling; but I soon found that the power of his muscles could not be easily overcome. When in a playful humour, he would often swing within arm's length of his pursuer, and, having struck him with his hand, throw himself from him.

'Whilst in Java he lodged in a large tamarind-tree near my dwelling, and formed a bed by intertwining the small branches, and covering them with leaves. During the day, he would lie with his head projecting beyond his nest, watching whoever might pass under; and when he saw any one with fruit, would descend to obtain a share of it. He always retired for the night at sunset, or sooner if he had been well fed, and rose with the sun, and visited those from whom he habitually received food.

"Of some small monkeys on board from Java he took little notice, whilst under the observation of the persons of the ship. Once, indeed, he openly attempted to throw a small cage, containing three of them, overboard; because, probably, he had seen them receive food, of which he could obtain no part. But although he held so little intercourse with them when under our inspection, I had reason to suspect, that he was less indifferent to their society when free from our observation; and was one day summoned to the topgallant-yard of the mizen-mast to overlook him playing with a young male monkey. Lying on his back, partially covered with a sail, he for some time contemplated, with great gravity, the gambols of the monkey, which bounded over him: but at length caught him by the tail, and tried to envelope him in his covering. The monkey seemed to dislike his confinement, and broke from him, but again renewed its gambols, and although frequently caught, always escaped. The intercourse, however, did not seem to be that of equals, for the Orang Outang never condescended to romp with the monkey, as he did with the boys of the ship. Yet the monkeys had evidently a great predilection for his company; for whenever they broke loose, they took their way to his resting-place, and were often seen lurking about it, or creeping clandestinely towards him. There appeared to be no gradation in their intimacy: as they appeared as confidently familiar with him when first observed, as at the close of their acquaintance.

"But although so gentle when not exceedingly irritated, the Orang Outang could be excited to violent rage, which he expressed by opening his mouth, showing his teeth, and seizing and biting those who were near him. Sometimes indeed, he seemed almost driven to desperation: and, on two or three occasions, committed an act, which in a rational being, would have been called the threatening of suicide. If repeatedly refused an orange when he attempted to take it, he would shriek violently, and swing furiously about the ropes; then return and endeavour to obtain it: if again refused, he would roll for some time like an angry child upon the deck, uttering the most piercing screams; and then suddenly starting up, rush furiously over the side of the ship and disappear. On first witnessing this act, we thought that he had thrown himself into the sea; but, on a search being made, found him concealed under the chains.

"This animal neither practises the grimaces and antics of other monkeys, nor possesses their perpetual proneness to mischief. Gravity, approaching to melancholy, and mildness, were sometimes strongly expressed in his countenance, and seem to be the characteristics of his disposition. When he first came among strangers, he would sit for hours with his hand upon his head, looking pensively at all around him; and when much incommoded by their examination, would hide himself beneath any covering that was at hand. His mildness was evinced by his forbearance under injuries, which were grievous before he was excited to revenge: but he always avoided those who often teased him. He soon became strongly attached to those who kindly used him. By their side he was fond of sitting; and getting as close as possible to their persons, would take their hands between his lips, and fly to them for protection. From the boatswain of the Alceste, who shared his meals with him, and was his chief favourite, although he sometimes purloined the grog and the biscuit of his bene-

factor, he learned to eat with a spoon; and might be often seen sitting at his cabin door, enjoying his coffee, quite unembarrassed by those who observed him, and with a grotesque and sober air, that seemed a burlesque on human nature.

"Next to the boatswain, I was, perhaps, his most intimate acquaintance. He would always follow me to the mast-head, whither I often went for the sake of reading apart from the noise of the ship; and, having satisfied himself that my pockets contained no eatables, would lie down by my side, and pulling a topsail entirely over him, peep from it occasionally to watch my movements.

"His favourite amusement in Java was in swinging from the branches of trees, in passing from one to another, and in climbing over the roofs of houses; on board, in hanging by his arms from the ropes, and in romping with the boys of the ship. He would entice them into play by striking them with his hand as they passed, and bounding from them, but allowing them to overtake him, and engage in a mock scuffle, in which he used his hands, feet, and mouth. If any conjecture could be formed from these frolicks of his mode of attacking an adversary, it would appear to be his first object to throw him down, then to secure him with his hands and feet, and then wound him with his teeth.

"On board ship he commonly slept at the mast-head, after wrapping himself in a sail. In making his bed, he used the greatest pains to remove every thing out of his way, that might render the surface on which he intended to lie uneven: and, having satisfied himself with this part of his arrangement, spread out the sail, and lying down upon it on his back, drew it over his body. Sometimes I pre-occupied his bed, and teased him by refusing to give it up. On these occasions he would endeavour to pull the sail from under me, or to force me from it, and would not rest till I had resigned it. If it were large enough for both, he

would quietly lie by my side. If all the sails happened to be set, he would hunt about for some other covering, and either steal one of the sailors' jackets or shirts that happened to be drying, or empty a hammock of its blankets. Off the Cape of Good Hope he suffered much from a low temperature, especially early in the morning, when he would descend from the mast, shuddering with cold, and running up to any one of his friends, climb into their arms, and clasping them closely, derive warmth from their persons, screaming violently at any attempt to remove him.

"His food in Java was chiefly fruit, especially mangostans, of which he was extremely fond. He also sucked eggs with voracity, and often employed himself in seeking them. On board ship his diet was of no definite kind. He ate readily of all kinds of meat, and especially raw meat; was very fond of bread, but always preferred fruits, when he could obtain them.

"His beverage in Java was water; on board ship it was as diversified as his food. He preferred coffee and tea, but would readily take wine, and exemplified his attachment to spirits by stealing the captain's brandy bottle. Since his arrival in London he has preferred beer and milk to any thing else, but drinks wine and other liquors.

"In his attempts to obtain food, he afforded us many opportunities of judging of his sagacity and disposition. He was always very impatient to seize it when held out to him, and became passionate when it was not soon given up; and would chase a person all over the ship to obtain it. I seldom came upon deck without sweetmeats or fruit in my pocket, and could never escape his vigilant eye Sometimes I endeavoured to evade him by ascending to the masthead, but was always overtaken or intercepted in my progress. When he came up with me on the shrouds, he would secure himself by one foot to the ratlings, and confine my legs with the other and one of his hands, while he

rifled my pockets. If he found it impossible to overtake me, he would climb to a considerable height on the loose rigging, and then drop suddenly upon me. Or if, perceiving his intention, I attempted to descend, he would slide down a rope, and meet me at the bottom of the shrouds. Sometimes I fastened an orange to the end of a rope, and lowered it to the deck from the mast-head; and as soon as he attempted to seize it drew it rapidly up. After being several times foiled in endeavouring to obtain it by direct means, he altered his plan. Appearing to care little about it, he would remove to some distance, and ascend the rigging very leisurely for some time, and then, by a sudden spring, catch the rope which held it. If defeated again by my suddenly jerking the rope, he would at first seem quite in despair, relinquish his effort, and rush about the rigging, screaming violently. But he would always return, and again seizing the rope, disregard the jerk, and allow it to run through his hand till within reach of the orange; but if again foiled, would come to my side, and taking me by the arm, confine it while he hauled the orange up.

"I have have seen him exhibit violent alarm on two occasions only, when he appeared to seek for safety in gaining as high an elevation as possible. On seeing eight large turtles brought on board, whilst the Cæsar was off the Island of Ascension, he climbed with all possible speed to a higher part of the ship than he had ever before reached, and, looking down upon them, projected his long lips into the form of a hog's snout, uttering at the same time a sound which might be described as between the croaking of a frog and the grunting of a pig. After some time he ventured to descend, but with great caution, peeping continually at the turtle, but, could not be induced to approach within many yards of them. He ran to the same height, and uttering the same sounds, on seeing some men bathing and splashing in the sea; and since his arrival in England has

shown nearly the same degree of fear at the sight of a live tortoise."

This animal survived his transportation to this country from August 1817, when he arrived, to the 1st of April, 1819, during which interval he was in the custody of Mr. Cross at Exeter Change, as much caressed for the gentleness of his disposition as he was noticed for his great rarity. There was no need of personal confinement, and little of restraint or coercion; to his keepers especially, and to those whom he knew by their frequent visits, he displayed a decided partiality. During his last illness, and at his death, his piteous appearance, which seemed to bespeak his entreaties to those about him for relief, did not fail to excite the feelings of all who witnessed them, an excitement evidently heightened by the recollection of human suffering under similar circumstances, which the sight of this animal so strongly brought to mind. He was shedding his teeth at the period of his death, which was probably promoted, if not caused by it. This was sufficient evidence of his nonage, and as he increased both in stature and general bulk during his residence here, this individual may be said to support the conjecture that the adult Orang Outang is no other than the Pongo.

Since the Baron Cuvier's classification of this animal at the head of the quadrumana, he and other naturalists have been strongly inclined to suspect that the Orang Outang, as recognised in Europe, is in fact a young Pongo, (a species to be noticed hereafter). The skeleton of the Pongo particularly the head, presents characters extremely remote from that approximation which the head of the Orang Outang makes to the human; Cuvier was nevertheless led to the presumption now stated, in consequence of having received a skull, said to be of the Orang Outang, from India. This skull seems to be intermediate between that of the Orang Outang as recognised here, and that of the Pongo,

and appeared to have belonged to an individual which was adult, but had not obtained its maximum of development.

The following particulars have been observed in confirmation of this conjecture, on a comparison of the Orang and the Pongo,

1. All the Orangs brought into Europe had the head smooth, an open facial angle, and were young individuals not exceeding three years of age at the utmost, and we know that the facial angle varies both in men and monkeys at different ages, and that the young always have it more open than old individuals.

2. The skeleton of the Pongo in Paris, (the only specimen known in Europe), displays by the teeth and the great development of the crest of the cranium, that the animal was not only adult but aged: these characters are observable in old baboons, the young of which, without shewing so great a difference as exists between the Orang and the Pongo, are still very different.

3. The exact correspondence observable in the number of vertebræ, dorsal, lumbar, and sacral, so various in different individuals even of the same genus in this order.

4. The disproportion of the limbs, and the form of all the hands altogether similar.

5. The nail of the thumb of the hinder hands equally short and narrow in both*.

6. The membranaceous bag at the throat equally large and formed alike in both.

7. The relative dimensions of the Orang—the presumed intermediate skeleton in possession of Cuvier—and the Pongo, graduated in proportion to the apparent age of each.

8. The colour of the Orang is red—that of the Pongo is black, but variations equally great in this respect are observed between the young and the adult of other species of monkeys.

* When this nail is found in the Orang-Outang it is either rudimentary or imperfect.

9. The habitat of both appears to be the same.

Should these animals eventually be identified, it will place in a still more ridiculous light, the grave surmises of soi-disant philosophers, who have alarmed the rest of mankind with the representations of their relationship to the anthropomorphous tribes, for the Pongo seems as little like a man as the most brutal of the baboons.

Of the Chimpansé our accounts as yet are remarkably imperfect, and often entirely unworthy of credit. It would be taking up the reader's time to little purpose to enter minutely into the details which have been so liberally communicated to us on this subject by travellers, nor indeed have we space to repeat the oft told tales of wonder, to be found in the volumes of voyages and travels re-echoed in the acknowledged or unacknowledged plagiarisms of subsequent copyists, even if we had the inclination to transplant these exotics once more into the present pages. The Chimpansé, like the Orang Outang, with whose history it has been very generally confounded, has proved a copious source of the marvellous to those whose interest or whose pleasure led them to cater for the indiscriminating and importunate appetite of credulity. It appears to have been, (as far indeed as there was any existing foundation for such a being,) the *homo troglodytes* of *Linnæus*. It is impossible to ascertain from his description whether he means to designate an animal or a man. He also calls him the *homo nocturnus*, and attributes to him many of the peculiarities of the Albino variety of the human race. Other parts of his description correspond with such particulars as are known of the Chimpansé, but disfigured considerably by inconsistency and fable.

From all that we do know of this animal, it should seem that our author, instead of placing him the last in the subgenus of the Orangs, ought to have ranked him at the head of the quadrumana: at least, if a closer approximation to the external traits of humanity entitle him to that distinction. Both in face and form the Chimpansé is more anthropo-

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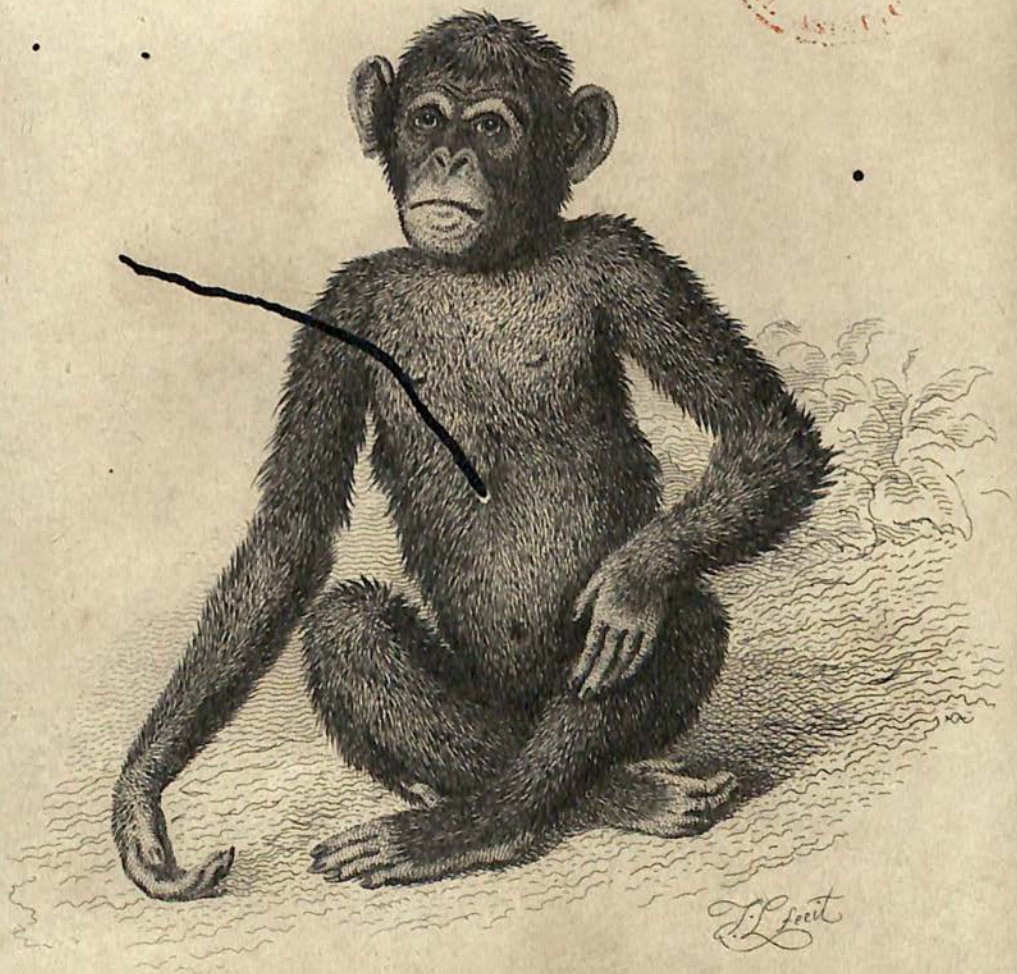

THE CHIMPANSÉ

HOMO TROGLODYTES Lin.

London Published by C.B. Whittaker Sep. 1.1825

morphous than any other ape, or indeed than any animal of which we have the least knowledge; and though it is decidedly nearer to the Orang Outang than to man in conformation, still there are points in which it deviates from its congener in approaching the human form. The Chimpansé, unlike the Orang Outang, has no intermaxillary bone. It has also the last joint of the great toe perfect. That it has greater facility for the biped, or upright mode of locomotion, than the Orang Outang, is also apparent by its possessing the *ligamentum suspensorium*, or round ligament of the thigh bone, which the Orang has not. Its facial angle is also less inclined, not describing more than about 50°, whereas that of the Orang inclines 65°. On the other hand it is distinguished by the superciliary ridges which are wanting in the Orang Outang, at least in all those young specimens which have been imported to Europe; but the Pongo has this peculiarity in a striking degree, and its probable identity with the Orang has been already stated. The arms of the Chimpansé have not the disproportioned length peculiar to the Orang, and the thumbs even on the upper extremities of the Chimpansé are larger and more serviceable than those of the Orang. The superficial anatomy of the throat and breast is also extremely human in the Chimpansé.

To illustrate as much as possible the personal peculiarities of these two highly curious animals, the Orang Outang and the Chimpansé, we have taken great pains in procuring accurate figures, hitherto a great desideratum. The figure of the Orang-Outang is from a sketch by the late Mr. Devis, R.A., made in India from a living specimen, and furnished by Mr. T. Landseer. That of the Chimpansé is from a specimen imported by Mr. Cross, but which died a few days after its arrival. The profile heads are from plaster casts, taken immediately after the death of the latter animal, and of Dr. Abel's Orang-Outang, and which, though devoid of that expression which animation imparts, are, it is hoped,

interesting for accuracy of outline. The skeleton of the Chimpansé, which may convey an idea sufficiently general of the osteology of both species, by adverting to the few points of difference above mentioned, is copied from the engraving given in the old work of Dr. Tyson.

The Chimpansés are less numerous than the other apes: but it is not altogether improbable that they were known to the ancients. This seems likely from a passage in the "*Periplus Hannonis*," or Account of a Voyage performed by Hanno, a Carthaginian Admiral, three hundred and thirty-six years previous to the Christian æra. He met some of these animals in an island on the western coast of Africa. "There were many more females than males, all equally covered with hair on all parts of the body. The interpreters called them *gorillés*. On pursuing them we could not succeed in taking a single male; they all escaped with astonishing swiftness, and threw stones at us: but we took three females, who defended themselves with so much violence that we were obliged to kill them, but we brought their skins stuffed with straw to Carthage."—(*Hannonis Periplus*, translated by V. Berkel.)

The Chimpansé appears to have an affinity, if not identity, with the large African monkeys mentioned by some travellers; indeed if there be truth in the statements so repeatedly made of the Barris, or great wild man of the woods of Africa, there seems as little reason to doubt that animal being the adult Chimpansé, as there is to doubt the fact of the Pongo being the adult Orang Outang; and it is observable that the cases are in most respects much on a par, except indeed that the Barris is only known to us by the indefinite descriptions of unscientific travellers, whereas the osteological characters of the Pongo have been observed and dilated upon by the first naturalists. All the specimens of the Chimpansé, as well as of the Orang Outang hitherto seen in Europe, displayed their nonage by the teeth and other indications.

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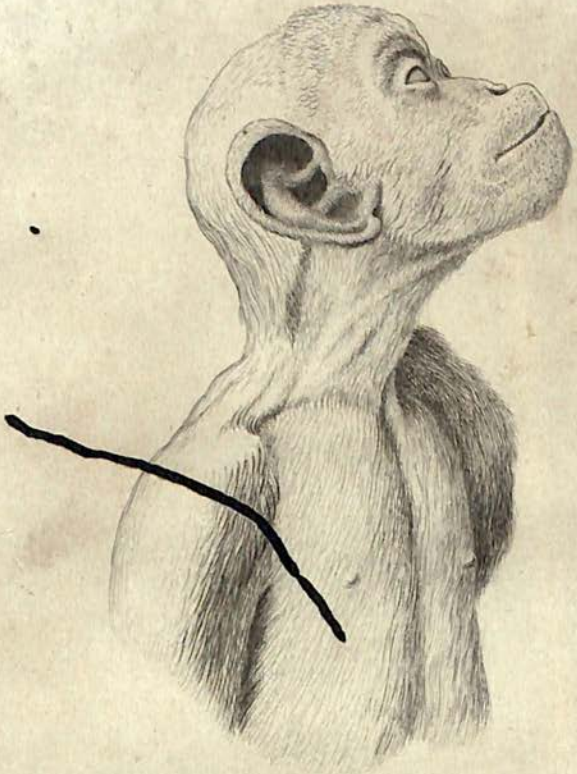

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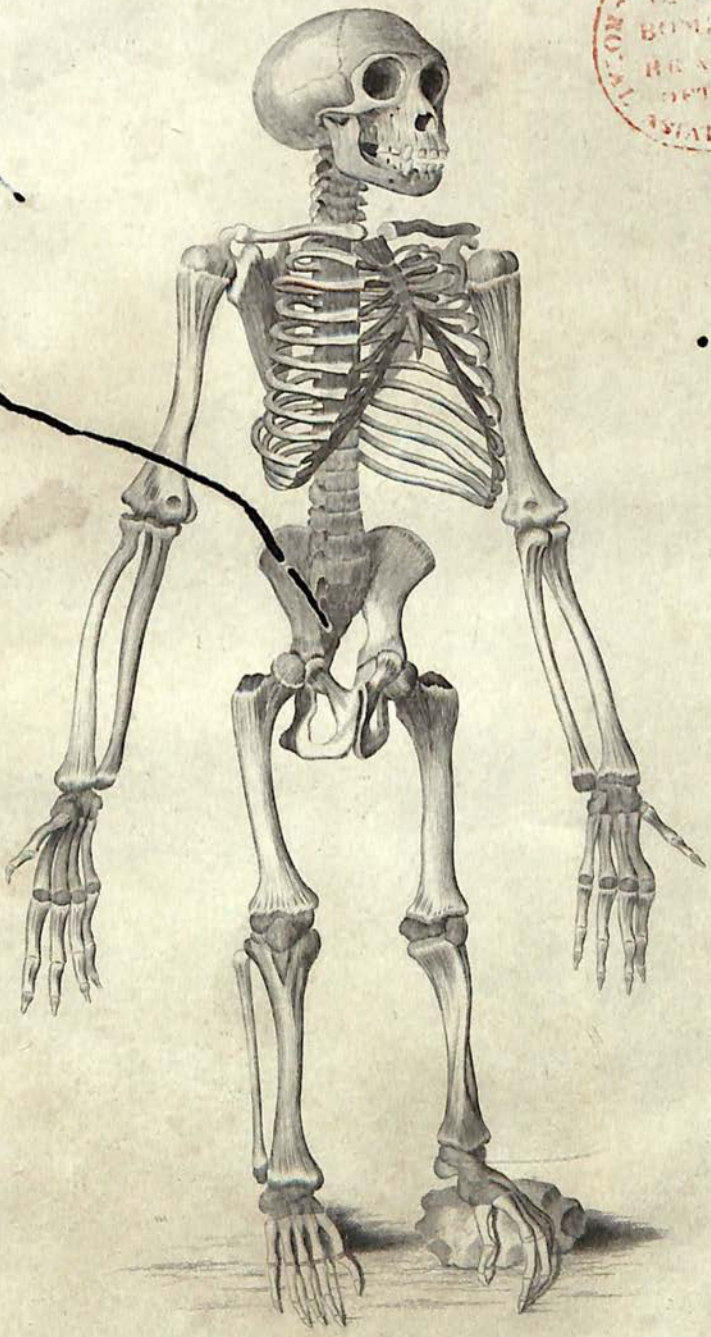
THE CHIMPANSE.—THE ORANG-OUTANG.

London Published by *B. Whittaker Feb.y 1824.*



SKELETON OF CHIMPANSE.

J.ª Basire sculp.ª

London Published by Geo. B. Whittaker, Feb.ª 1824.

Of the intellectual properties of this species, as we can add little new or even confirmatory of what has been already published, we shall not say much. If the account of Grand-Pré, and other travellers, can be relied upon, it seems to surpass that of the Orang Outang. Docility, submissiveness, and an apparent melancholy have marked the characters of the few young specimens brought to Europe, rather than any mental acuteness, surpassing that found in most of the species of the quadrumanous race in general.

The habitat of the Chimpansé seems strictly confined to intertropical Africa—that of the Orang Outang we have already noticed is Asiatic.

The Gibbon,* simia lar of Linnæus, called also *simia longimana* by Schreber, is distinguished in common with the other Gibbons by the enormous length of the anterior extremities. The arms, when the animal stands erect, very nearly touch the ground. The eyes are large and deeply seated—the nose is flat—and the ears not unlike the human.

There is a circle of gray hairs passing over the eyes, cheeks, and under the lower jaw, which completely surrounds the visage and gives a very singular appearance to the animal. The hair also on the backs of the hands and feet is gray, in all other parts of the animal it is black, as is also the skin. The Gibbon has not been found exceeding four feet in height.

* Gibbon appears to be a name of ancient origin. Delachamp, in a note on Pliny, tells us that the animal called *Cephos* by that naturalist, has received from Strabo the designation of *Keipon*, from which the term Gibbon or Gibon may easily be formed. The origin of these words may be Koph or Kophin, which in Hebrew and Chaldee is the name of the ape. It is, however, at least doubtful whether the Cephos of Pliny and the Gibbon be the same—the habitat differs, and Pliny has not noticed the elongated arms. The following is the passage: "Pompeii magni, primum Indi ostenderunt ex Æthiopia quas vocant *Cephos* quarum pedes posteriores pedibus humanis et cruribus, priores manibus fuére similes. Hoc animal postea Roma non vidit." Dal. Plin. Hist. Nat. lib. viii. cap. 19.

The disposition of this species is said to be gentle, its motions neither rude nor precipitate. It receives its food, which consists chiefly of fruits, almonds, *&c.*, without greediness and without impatience. It suffers much from cold and from a low temperature, and seldom survives long removal from its native country. The parts of the East Indies in which it is most commonly found, are the coasts of Coromandel, the peninsula of Malacca, and the Molucca islands. It is probable also, that the Gibbon may be found in some of the less southern provinces of India, travellers having described an animal called Fefe, found on the frontiers of China to which they attribute much of the characters peculiar to the simia lar.

The ash-coloured Gibbon, or Wou-wou, was, we believe, first noticed by Camper. It differs little from the simia lar, except in colour. The arms are also said to be longer, and the posterior callosities larger than those of the black Gibbon. The extremities of the limbs are of a deeper colour than the rest of the body. The individual described by Audebert was twenty inches in height, but it is probable that the average height of this and the preceding animal is about the same. This appears to be the animal which Pennant makes a variety of the great Gibbon, and which he saw in possession of Lord Clive. Its disposition is naturally gentle, gay, and frolicsome.

There is also a species undescribed by our author, called the little Gibbon, of which he says no further specimens were to be found, at the time when the *Règne Animal* was published, and he could not determine whether it was a species or variety. In a memoir, which he communicated formerly to M. Latreille, Cuvier calls this Gibbon, *l'orang varié*, from the difference of its colours. It is about one-third less than the great Gibbon, but it has precisely the same form and proportions. The face is surrounded with gray hairs, forming altogether a circle different in shape from that of

W. Smith, Esq.r Del.t

M. Griffith, Sc.

SMALLER GIBBON.

SIMIA LAR MINOR.

London. Published by George B. Whittaker, May 1824.

the larger species as appears by the figure. The top or crown of the head is blacker than the body. It has a small beard and whiskers. The four feet are covered with grayish hairs, like those of the great Gibbon; but the hair of the head, of the upper part and sides of the neck, the anterior portion of the back, the shoulders, the arm, the fore-arm in the external side, are brown, not black. The under part of the neck, the internal facing of the fore-arm, the breast, the belly, the thigh, the sides of the body, and the leg, properly so called, are not black, but of a gray mingled with brown. The superior portion of the back, and the crupper, are gray. This disparity of colours does not proceed from the difference of sex, as the two individuals of the great and lesser kinds, described by Daubenton, were females. It may perhaps result from the difference of age. The little Gibbon was brought from the peninsula of Malacca, the great one from Pondicherry. Erxleben, and other naturalists, have regarded the first as but a variety of the second; Pennant describes it and calls the lesser long-armed ape, *simia lar minor*, *Kebes* Linnæus. The figure of this species, from the pencil of Major Charles Hamilton Smith, to whose abilities and liberality the graphic part of this work stands very highly indebted, is from a specimen in M. Temminck's museum at Amsterdam.

Another species of the long-armed apes, discovered since our author's work was published, is *The* SIAMANG, (*Simia Syndactylus, Raffles, Tr. Linn. Soc. XIII. p.* 241.—*F. Cuvier.*) The general description of this Gibbon accords with that of the others of this sub-division of the apes; it seems therefore only necessary to advert to those particulars wherein it differs from its congeners; the most prominent of these is, probably, that the first and second fingers of the hinder extremities are united as far as the middle of the second phalanx; the colour is black all over, without the white circle about the face; it has two loose naked folds of skin on

the throat which are occasionally inflated. The hair is long and soft; but the face is without any, as are also the breasts of the female. The orbits of the eye are circular and remarkably prominent, and the canine teeth are long.

These animals are very common in Sumatra. They are generally found assembled in large troops, conducted, as it is said, by a chief, whom the Malays believe to be invulnerable. Thus assembled at sunrise and again at sunset, they vie with each other in making the most dreadful cries, perfectly stunning to those accustomed to them, and frightful in the highest degree to strangers. Their powers of voice are doubtless increased by the guttural cavity before alluded to, analogous to a similar apparatus found in the howling monkeys of America.

At all other times they appear to be perfectly quiet, so long at least as they are undisturbed. Naturally slow and heavy, they seem to want courage for climbing and activity for leaping, so that when suddenly surprised, they may in general be taken with ease; but nature, while she has deprived them of the power of avoiding danger by quickness and address, has endowed them with a great degree of vigilance for their preservation, so that they are generally alive to danger long enough before it reaches them to enable them to effect their retreat. When on the ground, however, they fall an easy prey, overcome by fear and rendered apparently more incapable by conscious weakness; in this situation their ineffectual efforts to fly display their imperfections, for the body too high and heavy for their short and slender thighs inclines forward, and their disproportioned arms acting like stilts, enable them to advance only by short and inefficient jumps.

However numerous their troop, a wounded companion is always abandoned immediately, contrary to the practice of some other gregarious monkeys, unless indeed it be a young

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THE SIAMANG.

London Published by George B. Whittaker May. 1824.

one: maternal affection will predominate over their other passions, and the mother of the bleeding young will immediately throw away her own life in an ineffectual attack on the enemy in which her desperation and want of tact for combat are alike displayed. Affection for their young is also displayed under more pleasing circumstances, and their care of the persons of their young by washing, rubbing, and drying them, in spite of the pettish cries and resistance of the infant Siamang, is highly ludicrous and amusing.

The Malays affirm, that the young siamang, before it can go alone, is always carried about by the parent of the same sex as itself; and also that these animals frequently fall a prey to the tiger, *&c.*, by the influence of that sort of charm which the serpent tribe exercises over birds, squirrels, *&c.*

This species is easily tamed, or rather reconciled to bondage, and will become in a very few days as indifferent as it was before wild. But unconquerably timid, it never displays the familiarity found in other monkeys, and its submission seems rather the result of extreme apathy than of confidence or affection. Equally insensible of good or bad treatment, gratitude and hate appear to be strangers to its exciteless mind. The Siamang, in short, displays but very little of intellectual faculty, generally squatting enveloped in its long arms, and the head brought down between the legs, (in which position it also sleeps,) it passes the greatest part of its time in sullen retirement; and seldom breaks its silence except by occasional disagreeable cries, not dissimilar to those of the turkey, which appear to express nothing and to be uttered without a cause. Even hunger can scarce draw it from its lethargic apathy: in confinement it takes food with leisure and indifference, conveys it to the mouth without avidity, and submits to its being taken away almost without an effort to retain it. Its mode of drinking is equally measured with

its other habits; it is by plunging the fingers in water and then sucking them.

Another species or variety is *The* ACTIVE GIBBON, Wou-wou, of Duvaucel, and F. Cuvier, a name which they have adopted for this animal in consequence of the noise it makes, notwithstanding the previous appropriation of the same name to the *Simia Leucisca;* also the *Gibbon Agilis* of the same writer.

M. Duvaucel, the describer of this animal, distinguishes it from the preceding Gibbon of Sumatra, in which island this also is found, by its greater degree of activity, particularly in a state of nature. It is nearly three feet in height; the face is naked, of a very dark blue colour, lightly tinted with brown in the female; the eyes are near each other, and sunken; and the muzzle is remarkably prominent. The nose is not so flat as that of the Siamang, and the nostrils are large and open laterally. The chin is furnished with a few black hairs. The ears are nearly hidden by the long hair around them, and there is a white band round the upper part of the face. The colour of this species seems to vary in different individuals and sexes, and in the same individual at different periods; but brown, with various shades, appears the prevailing tint.

The active Gibbon is not gregarious like the Siamang, but is generally found only with its female. It springs from tree to tree with wonderful agility, and can therefore but seldom be taken alive. In captivity, however, it exhibits little or nothing of its active powers, and though much more lively than the Siamang, is less so than the monkeys in general. Not given to the exciteless apathy of the Siamang, it may be frightened and quieted again; it avoids danger, and courts caresses: is a considerable glutton, curious, familiar, and sometimes even gay.

It differs from the Siamang in the absence of the guttural bag, though the cry of both is very similar: hence M. Du

vaucel infers that this bag does not affect the voice of that animal, or that its place is supplied in the Active Gibbon by some analogous organ.

The fingers of the upper hands of both these species touch the ground when the animals stand erect.

The Guenons appear to form by far the most numerous of all the quadrumanous families, and to present the greatest variety of specific differences. Most naturalists have arranged them after the Baboons, but our author, we conceive with great propriety, has bestowed on them the second place in the order. Less anthropomorphous than the Apes, by the elongation of the muzzle, and other quadrupedal peculiarities, less intelligent, less susceptible of attachment, and perhaps less capable of instruction, they are yet considerably removed from the disgusting ugliness, the malignant ferocity, the utter brutality of the Baboons. Many of them are indeed distinguished by no ordinary elegance of form and colour; and though the love of mischief seems to be a feature in their character, very generally predominant, they are tamed without much difficulty, and their sagacity and frolicsome disposition, are often made subservient to the purposes of profit and amusement.

The Entellus, which our author has placed at the head of the Guenons, and of which he has told us so little, is a species, according to the French naturalists very lately discovered. At least, it has but lately been known to zoological classification, and we are indebted for its notice to M. Dufresne. It must have often been seen by travellers, for it is a species of the Quadrumana, extremely common in Bengal its native climate. It is probably to this very circumstance that our ignorance respecting it is owing. Travellers are not unfrequently the least curious regarding objects which are the most common; drawing, not an unnatural, though many times a very erroneous conclusion, that frequent

recurrence of them in their own country must render them known in ours.

The Entellus, however, deserves a very particular attention. It is not only a species distinct from others by the mere colouring of certain parts, or the dimensions of certain organs ; but it appears to present a type altogether new. Its general physiognomy, the proportions of its limbs, and its intellectual characters are singular. Though it has all the generic characters of the Guenons, it has little or nothing of the exterior of these Monkeys. Instead of those vigorous limbs, equally indicative of agility and force, that petulance of movements and vivacity of look, the Entellus has limbs disproportionately long and remarkably slender, slow motions, and an expression of countenance, the apathy of which nothing can alter. Had it not been for the long tail it might have been taken for a species of Gibbon, and in fact, it was at first described as such, its relations with the other Quadrumana being established, rather according to its moral than physical characteristics. It seems to be among the Guenons, what the Ateles are among the Sapajous.

Besides the characters noticed by our author, the Entellus is distinguished by a black face as well as hands, which contrasts strongly with the whitish covering of the rest of his body. The hairs which surround his face form above the eye-brows a sort of projecting toupee, and under the lower jaw, a beard which is not pendant but protrudes forward. The external part of the ear is large, and circumscribed with right lines. The nostrils are considerably removed from each other. The jaws are less thick than in the other Guenons, and it is doubtful whether it has any cheek pouches. The general tint of the fur varies from whitish gray to whitish red. It is reddish down the back and on the loins, grows pale on the sides and becomes almost totally white on the belly and internal facing of the limbs.

Its total length is from three to four feet, the tail is nearly as long as the whole body.

It was named Entellus by its first describer M. Dufresne, from some fancied resemblance to an athletic old man.

> " Stat gravis Entellus, nisuque immotus eodem :
> Corpore tela modo atque oculis vigilantibus exit."

The red monkey, or Patas, is a pretty animal, and as it is well known we shall add nothing to the Baron's description of its person. It is about the size of the last species. Its temper is like that of most of the Guenons, violent, capricious, mischievous, and little susceptible of attachment. Brue gives an interesting description of the curiosity of those animals which exposed them to the view of his companions. They descended from the tops of the trees to the extremity of the branches, earnestly noticing, and apparently much amused by the boats as they passed along the river. They then began to take courage and pelt at the boats with pieces of wood, *&c.*; thus provoking a most unequal combat. When fired upon, they uttered the most frightful cries, and though many fell, the survivors appeared by no means willing to relinquish the contest. They redoubled their efforts, some flung stones at their adversaries, while others collected their own excrements for a similar purpose, and all displayed a determination of spirit, which must avail them much when engaged with opponents to whose powers their own are at all commensurate.

The two Mangabeys so closely resemble, that they have been treated by English writers hitherto as one species with a variety, under the name of the white eyelid monkey. Many specimens have, however, lately been observed, and the characteristic differences, however trifling, have been found invariable in all the individuals. This fact affords very just presumptive grounds of different species. Accordingly, M. G. St. Hilaire has divided them, giving to the collared Mangabey the epithet *Æthiopicus*, and to the other that of *Fuliginosus*.

These two species resemble each other as closely in moral as in physical characters. They are less petulant, less irascible, less unmanageable, than the Green Monkey, or the Malbrouc. They both have a mode peculiar to themselves of expressing their feelings, which is by raising their lips and showing their teeth, in a manner somewhat resembling a laugh. They are continually in action, assume a variety of attitudes, and sometimes the most grotesque. From the wonderful variety and vivacity of their motions, one would almost think that their limbs possessed a greater number of articulations and more strength than those of other Guenons, The females are more calm, and of a more gentle and insinuating disposition than the males. One singular peculiarity they exhibit, which is the carrying of their tails completely reversed, almost in a straight line parallel to the back. They seem to be confined to intertropical Africa.

The Negro-monkey, which in its adult state was described by Edwards, and when young by Schreber, is named from a supposed resemblance in its countenance to the Æthiopian variety of mankind. It is in general under eighteen inches in the length of the body: the tail is about equally long. The colour of this animal when young is yellow (as our author observes), lighter on the belly, and tinged with brown down the middle of the back. It afterwards becomes much darker, and the back grows a dark gray, slightly tinged with yellow or brown. The thumbs, which on the fore-hands are short, are long and strong on the lower extremities. The hair is long, especially round the face, and falls backward from the head, but sticks out laterally from each cheek.

The numerous citations of authors which we find in systematic writers on zoology, would naturally lead us to suppose that the animals, which are the subject of description, have been observed by many, and that in the union of their accounts a complete history of those animals was to be found. We discover, however, on examining these numerous

quotations, that they are little else than a vain parade of reading—that among all the authors thus cited, very few indeed have been original observers, and the great majority mere copyists—that the information they convey is unconnected and often contradictory, and so generally unsatisfactory in its character, that a state of total ignorance is preferable to such imperfect knowledge.

All modern naturalists have spoken of the animal, commonly called the Green Monkey, and to which Buffon has given the name of Callitrix. As it is found in the Cape de Verd islands, and the neighbouring part of Africa, it is one of a species most frequently imported into Europe. Notwithstanding this, it is curious to remark that we are in possession but of three figures of this animal, taken from living individuals. That of Edwards, of Buffon, and of Maréchale, in the "Menagerie du Muséum d'Histoire Naturelle," which is considered by F. Cuvier to be the best.

The colour of the Callitrix on the upper parts of the body are of a greenish yellow (whence its common name), and results from a combination of yellow and black rings on the hairs, in which the yellow predominates. The external facing of the limbs is more grayish, the yellow of the hair having partly disappeared.. The upper portion of the tail is like that of the body, but it is terminated by a long pencil of yellow hairs. The lower parts of the body, internal facings of the limbs, *&c.*, are grayish. The face, ears, and skin of the hands are black. Compared with the Malbrouc and some others of this subgenus, the muzzle of the Callitrix is more elongated, but we observe no corresponding modification of intellect to result from this difference.

In our menageries these monkeys generally display a considerable portion of malice and intelligence. Adanson is the only traveller who reports any thing of them in their natural state. He found them in immense numbers in Senegal. They remain on the trees in large troops, and pre-

serve the most profound silence even when they are wounded. He did not at first notice them, until his attention was summoned by their flinging at him branches of trees. They were not at all frightened by the discharge of fire-arms. He killed three and twenty of them in less than an hour.

The individual of which F. Cuvier gives a figure, he represents to have been remarkably beautiful and gentle, although an adult. He was fond of being scratched by those whom he knew, and seldom exhibited any desire to hurt. When he felt contented he usually expressed his satisfaction by a peculiar gentle grunt, which this author describes as like the syllable *grau*, with the sound a little prolonged on the *r*. This Callitrix was about one or two and twenty inches in length, from the occiput to the callosities: the tail much longer.

A species of Guenon, not enumerated by our author, but described by his brother M. F. Cuvier, in his great work on the Mammalia, is the Grivet. It corresponds in many particulars with the Malbrouc and the Callitrix, and appears to form between them an intermediate link. M. F. Cuvier hesitated for some time to determine whether the Grivet was a distinct species or merely a variety, but having examined many individuals, he ascertained that the organic peculiarities distinguishing them from the Malbrouc and Callitrix were invariably the same, and those differences he considered sufficiently important to be deemed specific.

This animal resembles the Malbrouc in its general colours, but differs from it in the form of the head which is less rounded. It differs from the Callitrix in being of a much more sombre green, having a white band over the eyebrows, and tail gray to the very extremity. It resembles it in the pyramidal form of the head, *&c.*

All the outer parts of its body except the limbs and tail are of a dirty green, which results from hairs annulated with

blackish gray and livid yellow. The same structure is prevalent in the hair of the thighs, but there is very little yellow, and all the rings are grey and white on the fore and hinder paws. The internal facings of the limbs, belly, chest, anterior covering of the shoulders, neck, and internal facing of the tail, are white. The ears, palm of the four hands, and face, are violet-black. The circle round the eyes is of a livid flesh-colour, and some long, stiff, and black hairs grow on the superciliary crest between the two eyes. The original country of this monkey is unknown, but it is probable that it came from Africa, like most of the other Guenons. It is often brought to Europe, and has doubtless been seen by naturalists, but not described, because it has been confounded with the Callitrix.

The Grivet possesses a similar disposition with the larger Guenons. A male, of which F. Cuvier gives a figure, was malicious and dangerous in its familiarity. A female of the same species, on the contrary, always preserved its docility. This last had been educated with great gentleness, and never received any thing but caresses from its master. Accordingly it acquired no small degree of confidence and affection.

This author remarks that this tendency to confidence, this need as it were of affection, is almost universally characteristic of the female monkeys, but when it occurs among the males may be considered an exception. He adds too, that the opinion that this disposition is manifested more towards men than women, is utterly unfounded.

The size and proportions of the Grivet are similar to those of the Callitrix and Malbrouc.

The same writer describes another species called the Vervet, differing little from the two last.

The Mammalia in general, but more particularly the Quadrumanous tribes, undergo such considerable changes in the progress of their development, and the characteristic

traits which distinguish the species, are frequently so delicate and evanescent that it is scarcely possible to study zoology with complete effect, but in the midst of a menagerie. There alone can we trace the successive modifications exhibited by the animal in the different stages of infancy, adolescence, maturity and decline. There alone can we assemble for the purpose of comparison, species, which though similar, are yet distinct, and which nature has not unfrequently located in almost opposite regions of the earth. United in the same enclosure, their slightest varieties become apparent, and the judicious observer has at once the opportunity of enriching science with new materials, and imparting to her disquisitions more preciseness and exactitude.

It would seem, that the Green Monkeys with long and arched tails, and the other general characters which we have noticed in the two preceding kinds, constitute more species in the Guenon subdivision than have yet been enumerated by naturalists. They admit, however, but of two.

The Callitrix of which we have already spoken, and the Malbrouc, on which we will now hazard a few observations.

This animal is one of the largest of the Guenon tribe. From muzzle to tail it is about a foot and a half in length. In walking on the earth he always supports himself on his four hands—but as he is essentially organized for the purposes of climbing and living in trees, his movements on the ground possess neither firmness nor facility. His hinder limbs being longer than the fore, the motion of the anterior part of his body cannot correspond to that of the posterior, the latter proceeding with the greater rapidity. This obliges him to carry the hinder part sometimes to the right, and sometimes to the left, when he intends a slow motion, and to shoot forward by jumps when he is desirous to run. This conformation, so unfavourable for animals designed to

live on the earth, is peculiarly advantageous for such as are sustained on fruits. The disproportioned length of the hinder limbs in comparison of the fore, is no impediment to climbing, but imparts on the contrary a wonderful degree of agility in shooting from branch to branch, and even from tree to tree. Accordingly, we find that these monkeys rarely descend to the earth. Assembled in troops, they dwell for the most part in those capacious canopies of verdant foliage which cover the rich forests of Southern Asia, fellow-citizens with the birds, exposed to no danger but from the larger of the serpent tribe, or the more insatiable rapacity of man. In these lofty retreats they are found in such numbers, as to annoy the traveller, as well by the petulance of their motions as the incessant iteration of their cries. Several specimens have been seen in Europe, of both sexes and of every age. There are no animals who can surpass them in agility. In confinement they are accustomed to shoot forward with such sustained vigour as to make several turnings in their course, as if flying, sustained in the air only by the impulse which they may receive from striking the walls of the cage. The Malbroucs seldom suffer their voices to be heard, and never but in a shrill and feeble cry, or rather in a dull sort of grunting noise. The males, in their youth, are sufficiently docile, but as soon as they arrive at adult age they become excessively malicious, even towards the persons intrusted with their care. The females remain more gentle, and alone appear susceptible of attachment. Circumspection forms a very peculiar trait in the character of the Malbrouc. He is nevertheless exceedingly irritable, but still, though subject to the most violent excitements from his ruling passions, he calculates all his movements with peculiar care, and executes them with surpassing dexterity, When he attacks, it is always from behind, and when the object of his resentment is un-

aware of his intention. He then precipitates himself upon him, wounds him with his teeth or nails, shoots away rapidly from within his reach, without however losing sight of him, and that as well for the purpose of seizing a favourable opportunity of renewing the attack, as to shelter himself from the vengeance of the adversary. This extreme irritability prevents the Malbrouc from ever being completely tamed, or brought to submit with patience to restraint. He is susceptible of no other education than that of nature. The moment he is treated with violence, the moment it is endeavoured to compel him to obedience, his petulance is at an end; he becomes melancholy and silent, and speedily expires.

These animals possess extraordinary dexterity in the use of their hands: these are the organs which they employ on almost all occasions: with them they carry their food to their mouth: they are equally the instruments of their sportive humour, and the weapons of combat. Notwithstanding the shortness of their thumb, they can seize between it and the fore-finger the minutest objects with the most wonderful facility. In eating fruits or roots they always pull them with their teeth, and smell every article of food which is presented to them. They drink constantly by suction. Their senses are extremely good, without being remarkably delicate, and they evidently make the principal use of that of sight. Of the reproduction of the species nothing is known: few of the Guenons reproduce in these climates.

If elegance of form, grace of motion, gentleness of disposition, superior sagacity, and penetration, of physiognomy, presented characters to the naturalist proper for the purposes of classification, the Mona, or varied monkey, would, incontestably, serve as a type for a peculiar division. It is strikingly distinguished from the other Guenons in

general, by these qualities, and more especially from those we have last described, the Malbrouc, the Callitrix and the Grivet. Even the Mangabey, though gentler than the others, is less so than the varied monkey. But this animal has no physical character to confirm and establish the peculiar distinction to which its moral qualities would seem to entitle it. In truth the species of the varied monkey does not differ essentially from the other Guenons but by its colours, and in these we discover a variety, which we do not recognise in the other species. Its head is of a brilliant golden green, its back and sides are of a beautiful marron, variegated with black. The exterior portion of the limbs, and of the tail, a pure slate-coloured gray, and its neck, chest, belly, and the internal facing of the limbs, a shining white. On each side of its cheeks are thick whiskers of a straw-coloured yellow mixed with black points, there are also other variations of colour, which we forbear to insist on, under the fear of becoming tedious.

This variety of colour made Buffon imagine that the Mona was the Kébos of the Greeks. But this is mere conjecture. The ancients have rarely described monkeys so as to enable us to recognise the species of which they spoke. They confined themselves to naming the animals, as if they were ignorant that languages partook of the destinies of nations, or as if they had written only for the advantage of their contemporaries.

The appellation of Mona, a generic name in the East for all monkeys with long tails, has been bestowed by Buffon on this species in a manner no less arbitrary. However, as among us this name has no signification, it may assume without inconvenience this specific acceptation It is seldom possible for the naturalist to apply to a new and foreign species one of its true names. But if the one he gives be well chosen, though arbitrary, it is always prefer-

able to those compound appellatives drawn from apparent characters, and which properly speaking are not names, and are seldom sufficiently exclusive, or sufficiently exact. The Lemur, for instance with a white forehead, (*Lemur albifrons*) has a female whose head is grey. It is indeed the bane of science that it should be overloaded with a profusion of classico-barbarous epithets, which are at once oppressive to the memory, and prejudicial to the judgment. The system of disguising ignorance and obscuring knowledge, by the mystification of symbols has not been suffered to repose in peace in the pyramids of Egypt, with the dust of its inventors. It has been resuscitated with success in more modern and enlightened æras, for it is too congenial to the monopolizing and selfish spirit of man, ever to be completely abandoned and forgotten.

The Mone has been commonly considered, as originally a native of Barbary, though we find no positive proof of this assertion. It is certain, however, that it comes to us from Africa, and if we may judge from its facility of living in our climates, it is probably peculiar to the more northern or more elevated regions of that immense continent.

F. Cuvier, describes an individual, which he says was developed under his own actual observation. He was extremely young when first received by the French menagerie, and his gentleness, his total want of petulance and malice, caused him to be left at liberty. Age did not alter his excellent disposition; he became large and acquired considerable strength; his address, and agility were unparalleled. But all his motions were gentle, and his actions were circumspect; he was persevering in his wants and wishes, but never violent in the attempt to enforce them. When, after considerable solicitation on his part, his requests were persistently refused, he would go off in a gambol, and entertain himself with some new object. He had no idea of property, he took every thing that pleased him,

even such articles as had previously been the occasions of his punishment, and he executed his thefts with dexterity and silence. He would open chests or boxes in which the key had been left, by turning it. He could untie knots, open the rings of a chain, and search your pockets with so much address, that you did not feel his hand there, although conscious that he was in the act of plundering you. The examination, indeed, of pockets was his most agreeable occupation, doubtless because he expected to find there articles of food, which were purposely placed there for him. He was not very conspicuous for affection, but when tranquil and preoccupied with nothing he received caresses with pleasure. When any exhibited an inclination to play with him, he signified his assent in a very graceful manner. He would throw himself into all possible attitudes, bite gently, press himself against the person, and accompany all these little gambols with a soft and gentle cry, which appeared to be in him the expression of joy. He never made grimaces of any kind, his countenance was always calm and often serious, and he never exhibited any of those disgusting propensities so revolting in many others of the Quadrumana.

The Mustache monkey may be considered as belonging to that group of Guenons, of which the Mone seemed to present a sort of moral type, and which is chiefly characterized by gentleness, gracefulness, and a tendency to affection and fondness of being caressed. The Mustache, in fact, combines these characters in a very high degree, and in him as well as in the Mone and Ascagne, or vaulting monkey, there is a strict analogy between those intellectual traits and the conformation of the cranium. They have a spacious forehead projecting over the face, a nose well marked between the eyes, and few traces of that superciliary crest, which characterizes others of the race. In other respects this species has all the Guenon character, and the traits by which it

may be discriminated, consist only in its colours, and chiefly in those of the face.

The head is covered with greenish hairs, deeper on the occiput than on the forehead. The hairs of the neck, of the back, the shoulders, the flanks, the croupe, and the basis of the tail, exteriorly are of a purer brownish green than those of the head. Those of the thighs are of a greenish gray, and those of the legs, grey with a slight yellow tint, and these different colours result from the coloured rings with which the hairs were covered, all grey at their lower half, and alternately black and yellow, very clear at the gray parts, brownish at the brown parts, and pure and unmixed at the green parts. The lower portions of the body and the internal facings of the limbs were of a deeper gray, than on the neck, breast, and belly. The lower part of the tail at its back was also gray, and all the rest, that is, about two thirds of its length round about, was red.

On each side of the cheeks were thick whiskers, bright yellow between the eyes and ears, but assuming a paler tint below the latter, and passing to a white as they approached the under jaw. Some black hairs separated the yellow part of these whiskers, from the green hairs on the head. The ears and skin of the hands flesh colour. All the face is of a fine lapis-lazuli blue, which assumes a blackish tint on the sides of the upper lip, and on the lower lip. But what renders the face of this animal peculiarly remarkable, is a white spot in the form of a broken chevron, which is under the nose on each side upon the upper lip, and has exactly the appearance of two mustachios. It is in consequence of this peculiarity that the animal received from Buffon the name of *Moustac*.

The Mustache may be, when adult, about a foot and a half in length.

F. Cuvier, whom we have had occasion to cite so fre-

quently, and shall have more frequent occasions to do so through a large portion of this work, for to him we are indebted for the most minute and interesting researches of the mammalia, mentions that subsequently to his examination of the Mone, two other quadrumana of the Guenon family presented themselves to his notice, possessing moral characteristics precisely similar. They exhibit the most perfect confidence and affection for such as treated them well, a gentle familiarity, no malice, and still less any irregular desires, in short it was impossible to behold any animals more amiable or more amusing, one of these was the Ascague, or long-nosed monkey, the other the Hocheur or vaulting monkey.

This resemblance of character induced our naturalist to pay more attention to the organization of these animals, than he had hitherto done, for he justly deemed it impossible, that there should be so much difference between their disposition, and that of the Guenons which we have precedently described, without some corresponding traces in their physical structure, some external symbols of this internal character. And here let us remark once for all, that this doctrine of mental and corporeal correspondencies, whether in man or other animals, does by no means militate against the most approved and orthodox opinions on the subject, of mind and matter. Notwithstanding the assertion of some acute philosophers, the constant conjunction of two phenomena, does not always prove that one is the cause of the other. There may be something else, hidden from our inspection, which is the true cause. Thus, if well-developed cerebral hemispheres be found invariably to accompany mental superiority, we have no reason necessarily to believe that such development is the cause of such superiority. All that we have a right to infer, is, that a superior mind requires an instrument of superior construction.

Nay, the mental superiority, so far from being the effect of the more perfect organization, may, for aught we can tell, be its proximate cause. There may be, there probably are original differences in mind itself, which are much increased by cultivation or neglect. Of the very influential agency of mind on matter, we are far from being destitute of the most sufficient evidence. And it may certainly be allowed us to suppose that the soul has some power and tendency to modify its material organ, and that not only by the application of such physical means as it acquires a knowledge of by observation and reason, but also by the peculiar virtue of its own essential elementary nature, and by its innate power and direct mode of energising on the body. This opinion is at least as rational, and as well supported by proof as its opposite, and beyond all comparison more elevated, more noble and more consolatory, more worthy of the omnipotence, the wisdom, and the unbounded benevolence of Divinity, more calculated for the improvement, and more consonant with the character of man.

But, whatever may become of this last speculation, it is incompatible neither with morality nor religion, to believe, that when the Deity, in his infinite and inscrutable wisdom, bestows a certain mental character on any animal, he may also bestow certain physical properties, to manifest its existence, and be subservient to its tendencies. We use the term mental without hesitation, in reference to the lower animals, for we do not believe that even they are mere machines, or that the approximations which they exhibit to human intellect, are the result of organization alone, any more than our own mental faculties.

To return from this hypothetical digression, to matters of fact. M. T. Cuvier found that the craniums of these quadrumana differed considerably in form from those of

the Malbroue, the Callitrix, the Mangabey, and the Grivet. With these last the forehead retreats abruptly, the anterior part of the brain is altogether compressed, and this organ receives no development but on the opposite side. On the other hand, in the Mone, the Ascagne, and the Hocheur, the forehead has almost a vertical elevation above the eyes; thus the facial angle which among the other Guenons varies from 50° to 55°, will be with those latter from 60° to 65°. In fact, on examining the naked skulls of the two groups, the frontal bones of the one were found much more rounded, and the superciliary crests less strong, than those of the other, and the same difference was also remarked in the parietal bones. Our author observed these characters very strongly impressed on the Mone, but fearing that they might be only individual, he did not attempt to generalize them. But having made similar discoveries respecting the other two species, he came to the conclusion that they were all peculiar to a group which, in reference to intelligence and docility, might be considered as a link between the Guenons and the Orangs. And he seems to think that on a more attentive examination, other characters might be recognised to distinguish them from the Guenons, and such as might be employed with more facility than a few degrees of difference in the projection of the forehead. It was thus that the Guenons were at first separated from the Macaques, only by the facial angle, but other characteristic distinctions were discovered afterwards, to confirm the essentiality and propriety of the first.

To our author's short personal description of the two last-mentioned animals we shall only add, that the Ascagne is about fifteen inches in length, and the Hocheur about twenty. The tails in both are much longer. The Ascagne is also called the vaulting monkey, and is the *blanc nez* of Buffon. The Hocheur is, however, properly the white-nosed monkey, and differs from the Ascagne only by the

greater prominence of this organ. It has been also called the nodding monkey.

The Nasique or Kahau is also called the Proboscis Monkey, and is an animal of a most singular and grotesque appearance. Its essential character is the enormous length of the nose. The line of the upper part of the bridge of this organ approaches to a rectangular position in reference to the face, and the entire nose presenting the appearance of a proboscis, has given rise to its denomination. It has a furrow passing down the upper part, which nearly moietizes it towards the extremity. The nostrils open underneath near the end. The face is black. The whole body, as well as the head, is thick, strong, and shapeless. The eyes are large and situated at a distance from each other. The ears are small and naked. The mouth is large, the canine teeth long, throat very short; the nails of the fingers are much compressed and arched. Those of the thumbs large and flat. The general colour is different shades of yellow, with some irregular patches of red about the lower part of the back. The chin is white. The length of this animal from nose to tail is about two feet two inches. The tail two feet three inches.

We are hitherto very much in the dark on the subject of the habits or character of that singularly-varied species as to colour, the Douc or Cochin-China monkey, and deem it needless to amplify the short description of the person of the animal in the words of the text. In dismissing thus briefly this or any other species, the reader will perhaps forgive being reminded that the essential character of each are common to all the species found in every subdivision; such essential characters need not therefore be repeated, especially as these artificial subdivisions are invented and employed almost solely for the purpose of obviating such repetitions.

The various tints of colour found in this animal, seem to bear a sort of general analogy with the proboscis monkey,

which is almost equally particularized, though differing from this very materially in its extravagant nose and shapeless body.

It is a large species, said to measure, when erect, three feet and a half in height; the tail is about one fourth shorter than the body.

Equally mindful of brevity on the one hand, and of the portion of information fairly to be expected from a work so comprehensive as the present on the other, we shall proceed to notice two or three other species of Guenons, described by scientific writers. The Golden Guenon (*Cercopithecus auritus*) described by M. Temminck, has the hair of an uniform golden yellow colour, deeper on the upper parts, with a black patch on the knee, the belly is nearly naked, the fingers of the fore-hands are covered with hair as far as the second phalanx only, but those of the hinder hands are hairy to the nails, the forehead and ears are enveloped in hair much longer than the rest. It is as big as the Douc, but the tail of this species is longer than the body. The specimen described in the possession of M. Temminck came from the Moluccas.

M. Temminck describes under the epithet *latibarbatus*, a species of Guenon with a large beard spreading laterally; with a tuft at the end of the tail; and the face of a purple colour surrounded with long white hairs. The body is thin, the head round and large, the thumbs of the anterior hands are shorter than the others. The hair is silky, of a uniform pale gray brown colour, both in the lower and upper parts of the animal. It is about a foot long, and the tail is nearly of the same length. M. Temminck states with regard to the colour, that when the animal is adult, its colour is black.

This description seems to correspond with that of the purple-faced monkey of Pennant (Quad. v. i. p. 199,) taken

from a drawing, but which that writer seems to consider as a variety of the Ouanderou.

The broad-toothed baboon of Pennant seems likely to have been an adult specimen of this species.

The bonneted monkey of Pennant (Quad. v. i. p. 210, the simia capileata of Shaw, v. i. p. 53,) was described from a specimen in the Leverian museum. Shaw thought it was allied to the American horned monkey and to the Capuchin. Buffon, on the contrary, considered it as connected with the Chinese monkey of the old world. It appears, however, to be distinct. The face and breast are of a pale yellow brown, deeper on the back, the lower part of which, as well as the exterior of the limbs, incline to brown. The hair on the head stands up in the manner of a circular cap or bonnet. It is about the size of a cat. Its habits and country are unknown.

We might here insert descriptions from several individuals among the Guenon, both from accounts in print, and from specimens which have fallen under our own observation; we deem it, however, more prudent to finish our essay on this division of the order here, and to refer to the table, for the specific characters, synonymes, &c., of all the rest.

Supplement on the Baboons.

In whatever degree the countenance and form in the human species may be indexes of the intellectual and moral character, however liable we may be to error in pronouncing on the man from those exterior appearances, it is pretty certain that they form among the lower animals a tolerably safe criterion of judgment. We have observed in our researches on the Quadrumana, that the form of the head

and the expression of the countenance have a long and close connexion with the intellect and disposition. In the Orang-Outang, the Gibbons, the Chimpansé, where the approximation to the human face and form is most remarkable; there is the greatest degree of intelligence, of gravity, of docility. There is little or nothing malignant nor disgusting. The Guenons, which are all more or less distinguished for petulance, for mischief, and for malice, carry in their looks, their shape and motions, the external indications of such propensities. Those among them of a milder and more harmless character, those which exhibit only sportive playfulness, and innocent frolic, those which discover any feelings of gratitude or any susceptibility of attachment, are likewise distinguished (as we have already seen) by corresponding differences of conformation, and manifest in the mildness and expressiveness of their glances, in the gentleness and gracefulness of their external motions, the favourable peculiarities of their internal character.

Of all the quadrumanous varieties, the tribe upon which it now becomes our duty to offer a few supplementary remarks, is by far the most brutal, the most ferocious, the most vicious, and the most disgusting. Accordingly we find that the external characters, correspond with these interior qualities, and that the baboons have less resemblance to the human, and more decided conformity with the animal type than those species we have hitherto reviewed. This becomes more remarkable as we proceed through the species, and is particularly conspicuous in those animals to which the name baboon is popularly applied; and until lately, was exclusively confined by natural historians. We find, however, the same character pervading pretty nearly among them all—from the Magot, which was formerly reckoned among the apes, and generally in form at least, to be a connective link with the Orangs, to the ferocious Papion, considered the brutal Mandril, and the formidable Pongo,

whose true rank in the creation, and, indeed, whose real attributes, have been but lately ascertained and determined.

The Magot, or Barbary Ape, placed by our author at the head of the baboons, is an animal not without intelligence. It may be remarked, that this precious gift of nature, which animals have received for the purposes of their preservation, and to fix their rank in the universe, always conduces in a state of natural liberty, to their welfare and independence; but on the contrary, under the government of man, it too frequently becomes to them a fertile source of misery and persecution. The voice of the shepherd is in general sufficient to guide and conduct the unintelligent sheep. Their limited faculties do not permit them to be employed in any way, when the intervention of harsher means may be necessary, to enforce obedience. The whip is in requisition, to awaken the intelligence and stimulate the activity of the horse and dog, and man himself in the degraded state of slavery, is subjected to similar instruments of *Education*. It is to his intelligence that the Magot owes the numberless torments inflicted upon him by the mountebanks and show-men. Excepting the Orangs and the Gibbons, he is the only monkey of the old Continent capable of receiving a certain degree of instruction. The others, stupid or ferocious, were incapable in a state of slavery of comprehending any thing; but they have the consequent advantage of preserving their repose, while the Magot is constantly exposed to lose both his comfort and freedom.

Notwithstanding this, the male Magot only submits to the dominion of man in extreme youth, and when his active faculties have not yet acquired their complete force and development. Arrived to adolescence he begins to be less tractable, and in a short time, like the Macaques and others of this sub-genus refuses submission of every kind.

Good treatment and bad, are equally without effect upon him. Alike incapable of confidence and of fear, he evinces nothing but a savage love of independence, which appears to be his only want. The painful state into which this feeling throws him, especially when it is strongly excited by severity, soon plunges him into a melancholy, which is speedily followed by consumption and death. But, if in his state of slavery, he is left to repose, he soon becomes accustomed to his situation, but loses all his natural activity. Seated on his posteriors, with his arms leaning on his knees, his hands pendent, he looks stupidly at what is passing around him, and, unless when occasionally drawn from this lethargy by the pressing calls of nature, he appears to pass his life in a sort of intermediate state, between the existence of animals and plants. His vegetative functions still continue to operate, but with the exception of sensation, every thing which depends upon intelligence seems completely inoperative. For it holds equally true of animals as of man, that the empire of thought soon perishes, when the stimulus of sentiment is over. On the other hand, in a state of liberty, the Magot is perhaps one of those animals which combine to the highest degree, vivacity and variety of desires and sentiments. He is distinguished for petulance of disposition, and for intelligence the most active and penetrating. These qualities united to the peculiar organization of the Magots, give them a decided superiority over most other animals, and render them almost absolute in the countries they inhabit. Assembled in numerous troops, they cover the trees of the forests, openly attack those enemies which they feel competent to encounter, and by their number, and the indefatigable reiteration of their cries, they repel such foes as are really formidable. Their most dangerous adversaries are cats of the middle size, who, possessing like themselves the faculty of climbing, often surprise them in the silence

and obscurity of night. Notwithstanding, however, their numerous sources of security, the Magots do not appear to occupy any great extent of country. It is not ascertained that they are to be found beyond the limits of Barbary, and of Egypt, and the southern parts of Spain. The assertion that they have been met with over the entire of Africa, and in India and China, appears not to rest on sufficient grounds. According to such accounts as are most to be depended on, their principal abode appears to be in the northern regions of Africa.

In the great work of F. Cuvier, and G. St. Hilaire, the Magot is attached to the division of the Macaques. The muzzle is large and projecting, the eyes approximated to each other, and deeply fixed in the head. The brows extremely thick, forehead narrow, short neck, powerful canine teeth, and the body thick and muscular. All these characteristics strongly bespeak the fierce and savage nature of the animal. His feelings, of whatever kind, seem generally to be expressed by a single grimace of a peculiar nature. This consists in contracting the lips, drawing in the cheeks and exhibiting the teeth. Sometimes indeed, he may be observed to testify his satisfaction by moving the lower jaw, and making a trifling noise with his tongue.

The Magot walks habitually on all-fours, but awkwardly; but, like the other quadrumana, it displays astonishing facility in climbing. To rest itself, it sits down, and when desirous of sleep, it either lies down on one side, or remaining in a sitting posture it suffers its head to fall between the hind legs. It carries its aliments to the mouth with its hands, or sometimes gathers them up with its lips. It puts every thing which it does not know, or of which it entertains any suspicion, to its nose for the purpose of smelling it. It is easily habituated to take aliments of every kind. In a state of nature it chiefly subsists on fruits and leaves. The articles of food which agree with it best in a

state of captivity, are fruits, bread, and cooked vegetables, particularly carrots and potatoes. It drinks by suction. When angry the jaws move with astonishing rapidity, the movements become abrupt, and its voice is hoarse and rough, though sufficiently soft on other occasions. Having no need of any offensive weapon, it has for defence its strong canines and fingers, of which, the nails, thick and long, make very deep wounds. The natural inclination of the Magot to live in flocks, leads him to adopt the little animals which are presented to him in a state of captivity. He takes them about with him holding them closely embraced, and is excessively angry if any one endeavours to deprive him of them. Its favourite amusement is cleaning their fur from the slightest impurities, which he invariably carries to his mouth. Whenever the Magot expresses any affection for his master, it is exhibited in the same manner by picking and examining his hands and head. These animals, we are assured, manifest the greatest care and tenderness for their offspring, and keep them in the greatest possible degree of cleanliness. The Magots have occasionally been reproduced in a state of captivity, but as this phenomenon has occurred only under the observation of careless and ignorant exhibitors, we have no correct information on the subject.

The largest of this species do not surpass a middling sized dog in dimensions. The average length is about two feet or two feet and a half. The females are generally smaller and gentler than the males, and their canine teeth are little longer than the incisors.

The ancients were acquainted with the Magot, but it would seem that following Aristotle, they distinguished two species, one of which they called Pithecus, and the other Cynocephalus. For a long time, modern naturalists endeavoured to make a just application of those two names, and for that purpose they made of the females and the young

Magots, the species Pithecus, and of the adult male Magot, the species Cynocephalus. The observations of M. de Blainville, on the monkey dissected by Galen, have established the fact that the Pithecus was our Magot, but as we are not acquainted with any Macaque without a tail, it is impossible for us to make any precise application of Aristotle's Cynocephalus. It appears probable from every consideration, that this author was induced to make the two species by an error of the same kind as that committed by our modern Zoologists, in separating the young Magots from the adults. Of the true Cynocephalus he was obviously ignorant, which is a species belonging to a very different group, and some of which are found to be figured on all the monuments of the Egyptians, and which were worshipped by those people, and principally at Hermopolis.

However that may be, the Magot is so frequently seen in Europe, that it is one of the best known of the Quadrumana. It has been, however, designated under very different names—Prosper Alpin, and Brisson, call it the Cynocephalus. It is the Innuus and Sylvanus of Linnæus and other systematic writers, who have adopted the distinction above alluded to of Pithecus and Cynocephalus.

The Ouanderou, placed first among the Macaques by Cuvier, is a species aboriginal in the East Indies, and not often seen in Europe. It was known to naturalists by the accounts of some travellers. Robert Knox, in his account of the island of Ceylon, appears to have given a figure of it. Daubenton and Buffon have given it the name of Ouanderou, a name applied by Knox to many monkeys, differing from each other in colour, but which he regarded as varieties of the same species. This idea has been adopted by some naturalists, but does not appear well very founded. At all events such an opinion ought not to be delivered in a dogmatic way, unsupported by proof. Direct observation is the only guide which we can safely follow for the establish-

1. THE "O OUANDEROU.

2. MAIMÖN, 3. CHINESE BONNETED MONKEY.

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ment of varieties among the Mammalia. The Ouanderou, therefore, can only be considered, a species of the Macaques, distinguished by having the upper parts of the body entirely black, with a large white ruff round the neck.

M. F. Cuvier describes a female of this species in the Parisian Menagerie. It was of a middle size, measuring (in French measure), eighteen inches from the muzzle to the beginning of the tail; the tail itself measured ten inches, and the average height was about a foot. The head, neck, shoulders, arms, back, flanks, thighs, legs, crupper, and tail, were all of a very fine black. The abdomen, breast and circle round the head, white. The hairs were generally long, more especially on the head, at the white ruff which grows from each side of the forehead, and is joined under the chin covering the posterior part of the cheeks. At the extremity of the tail too, the hairs are long, forming a sort of bunch. The face and hands are black, but the callosities are reddish.

The manners of this individual were mild and insinuating, but it was very capricious as is the case with all the Macaque species, on the duration of whose sentiments it is impossible to reckon. The individual seen by Buffon at the fairs of St. Laurent, was a male of the most excessive malice. Another, possessed afterwards by the King's Menageries in Paris, was of the same disposition. Schreber and Pennant, have each of them published a description of two. The one under the name of Simia Silenus, the other under that of the Lion-tailed monkey.

An individual of this species was until lately for some time in possession of Mr. Cross at Exeter Change, and had for a companion in the same cage, a young mandrill. The latter, not having attained the complete development of its personal character or the savage moroseness of disposition incident to the adult state of this species was much disposed to sportiveness and play. The ouarderou

though not so often "i' the vein" for wanton gambols, would however not unfrequently join its companion, and did not exhibit that degree of malevolence attributed by some naturalists to the species. Its attention seemed generally occupied and the monotony of its existence relieved by any thing that was passing out of the limits of its prison-house. Another specimen has also fallen under the editor's observation in Woombwell's collection, which was so far gentle and sociable as not to be confined within a cage, but merely fastened by a light chain of some length, in which situation it might have found opportunities, if it had possessed the inclination, of gratifying a malicious and savage inclination.

It is indeed difficult to discover the real character of a species from a few individuals. Their dispositions undergo changes equally great with their persons at different periods of their existence, so that both the personal and moral character of an animal may be widely different and equally true when taken during the young, adolescent, or aged period of its life. Among the Hindoos this animal is called Nilbundar.

On the hair-lipped monkey (Macaque of Buffon) we shall next make a few observations. He was until lately the only author who has described the species after living individuals, but as he had under his inspection only two males, one adult and the other young, (for his Egret seems to be nothing more than the Macaque,) he has given us a somewhat imperfect account, and seems in some measure to have confounded this monkey with others.

F. Cuvier has given a description of a male and female which we shall here epitomise. The adult male Macaque may be said to measure in length nearly two feet and a half, nor is the tail much shorter. All its proportions are heavy and clumsy, more especially in the anterior parts. Its head is large, flattened above, and very strong in proportion to

the body. The muzzle is short and blunt. The nose is flat, and there is a strong crest, which advancing beyond the brows covers the eyes. The fingers are united by a membrane as far as the second phalanx. His position is either on all-fours, or sitting on his callosities. He sits in either of these attitudes, carrying his aliments to his mouth with his fingers, or gathering them up, with the mouth itself. Before he swallows he always fills his cheek pouches and drinks by suction. He sleeps either couched on his side or seated. His generic characters are in all respects like those of the Magot. Of the colours of this Macaque we shall add nothing to the description of our author.

The female is considerably smaller than the male, and her proportions are more compact. The head is smaller, and the superciliary crest not so prominent, though it equally covers the eyes. The canine teeth are small and scarcely pass the incisors, which is a character of all the females of this subdivision. The face is surrounded with gray hairs long and straight. The hairs of the summit of the head, are directed towards the medial line, and form there an elevated crest, constituting the character of the Egret. It seems extremely probable that the Egret is nothing but a female Macaque.

From the union of these two individuals a young female Macaque was born on the night of the 10th of October, 1817, at the French Menagerie. The particulars previous and subsequent to this important event, are detailed by the learned naturalist above referred to, with a circumstantial minuteness which we cannot be expected to follow. Suffice it to say, that the mother entirely neglected her offspring, which soon perished, though its scientific foster fathers, tried to nourish it artificially. This aberration of instinct is by no means uncommon in animals in a state of captivity. Their faculties seem altogether revolutionized. This female proved again productive in the following year,

but the second offspring shared the fate of the first. The period of gestation was ascertained to be seven months.

Buffon has spoken of the next species (the Maimon) or Pig-tailed Baboon, and Daubenton has described the same animal with his usual exactness. But Buffon seems to think the Maimon, the same with the Pig-tailed monkey or Baboon of Edwards, and naturalists admitting this have made but one species of the two animals. Accordingly, Audebert having to describe a species of the Macaque subdivision, and not being able to make the animal before him agree with the pig-tailed monkey, conceived that it must be the short-tailed Macaque of Buffon, and gives a figure under the name of Rhesus. Our author's brother, having had at the Menagerie, a male and female of the kind described by Edwards, which proved productive, and five or six individuals of each age and sex, of the short-tailed Macaque, is enabled to confirm the clear distinction of species as laid down by the Baron. We shall not follow him in his very minute description of colours, &c., which cannot prove very interesting to the general reader. One singular characteristic of the Maimon is the extreme flaccidity of its flesh. Even very young individuals are found to possess on each side of the throat hanging folds of flesh, which might be considered in other animals the signs of age, and the breasts and belly very rapidly assume a similar character. Hence, when the Maimon grows fat, it acquires a rotundity of form that renders it almost monstrous. This is particularly manifested in the females, whose teats enlarge excessively, as well as the belly, and the features become almost lost in masses of fat. Maimons of this description have been presented at exhibitions as a new and extraordinary species, approximating to the Orang-outang, an error which the rounded and flesh-coloured throat and red nipple have contributed to give currency to.

These animals are aborigines of India. They people the forests on the banks of the Ganges, and encouraged by that invincible repugnance which the Hindoos exhibit to take away life, they come, with impunity, in considerable numbers into the towns and cities, to search for more agreeable food than they can find in the woods.

The natural character of the Maimons is altogether intractable. While young, indeed, they are susceptible of some familiarity. But they soon grow malicious, and age renders them extremely ferocious. As they are far from deficient in intelligence and penetration, their malice is of a very dangerous character.

In conclusion on the Macaques, we shall just observe, that the pig-tailed baboon of Shaw, which is the Rhesus of Audebert, is distinct from the pig tailed baboon of Edwards, the latter of which is the brown baboon of Shaw and the long-legged baboon of Pennant and Buffon. Shaw's pig-tailed baboon is now called the Maimon, a name which Linnæus applied as specific to a young specimen of the Mormon or Mandrill, the great baboon of Pennant, and the varied baboon of Shaw, so that these three species of animals are involved in considerable confusion, from which, perhaps, they are scarcely yet completely extricated. F. Cuvier has, however, in some measure, dispelled the mists of error on this subject. He declares, from observation, the Maimon and Rhesus to be clearly distinct; and, as we find by consulting a later number of his great work, he seems to think the name of Rhesus more applicable to the animal we have just described, than that of Maimon. The "Singe á queue de Cochon" he thinks the same as the Maimon. For the satisfaction of such readers as are fond of precision, we shall give his statement of the synonymes of these animals.

The pig-tailed baboon, or Rhesus of Audebert, is the short-tailed Macaque of Buffon, the short-tailed Patas of the same writer, and the animal we have just described

under the name of Maimon, which is also the Simia Erythræa of Schreber. The brown baboon, or Maimon of Buffon, is the pig-tailed monkey of Edwards, the Maimon of Audebert, and the "Singe a queue de Cochon" of Frederic Cuvier, to which the Linnæan name of Nemestrina properly belongs.

We shall now make a few general observations on the Cynocephala.

The quadrumana which constitute this subdivision, are so intimately related that their natural resemblance is at first extremely striking. In fact, their habits of body, the expression of their physiognomy, the proportions of their limbs, announce them to be all of the same family, and a more attentive examination of their organs completely confirms this judgment. This uniformity of character has, however, been but lately recognised and acknowledged. Our author and M. Geoffroy St. Hilaire were the first to separate these quadrumana from other monkeys, with which they had been confounded. In fact, the character of the tail chosen by Linnæus for the purpose of classification, could never give birth to natural divisions. That one organ should properly form the characteristic distinction of any group of animals, it is necessary that its importance should be such, as that its absence must produce a fundamental alteration in the other parts. Now, among the quadrumana of the old world, the tail is an organ, apparently, in a great measure useless, employed for no purpose, and may be considered as merely rudimental. Accordingly, we cannot adopt this character for the Cynocephala, when we have once combined these animals by a consideration of the general assemblage of their organs; for any thing remarkable in their tails, is yet common to them with some other monkeys, in all other respects totally dissimilar.

Our author and M. Geoffroy St. Hilaire took the facial angle, as a distinctive character of the quadrumanous

groups of the old world. This which represented the capacity of the brain, answered the purpose very well, and it would be impossible to adopt a better, if unfortunately it did not vary in individuals of different ages. This difficulty proved the greatest inconvenience with the Cynocephala, and led to the erroneous junction of the young of this subdivision to the Guenons or Macaques. To avoid these errors, M. F. Cuvier has proposed to join to this character the structure of the teeth, and the situation of the nostrils, which are prolonged to the extremity of the muzzle. Among the quadrumana, the Cynocephala and the Macaques alone have a sort of *talon* at the posterior part of the last cheek-teeth in the under jaw, and the former alone have their nostrils prolonged, so as, in fact, to have no muzzle beyond. Though these characters are only the result of external observation, yet they are most powerfully influential on the organization, and we can scarcely doubt of their agreement with others which may be yet discovered. The structure of the teeth and nostrils is closely connected with the organs of taste and digestion, not to mention that the first is immediately derived from the very nature of the animal, and has always been considered as presenting secondary characters of the most general and determined description.

This author differs a little from his brother, the Baron, in the enumeration of the Cynocephala. He makes the species six in number—the Papio, the Chaema, the Baboon, the Tartarin, the Mandrill, and an additional species which he describes differing somewhat from the last, and calls the Drill. Perhaps this arrangement is better than the other, and indeed we can discover no sufficient reason for the exclusion of the Mandrill from the Cynocephala, and its classification as a distinct division.

It may be said of all the Cynocephala, that they arrive at considerable magnitude, equalling at least the size of the

wolf. Their proportions indicate vigour and agility, while ferocity and rage, though not unmingled with intelligence and penetration, are painted on their physiognomy. It is of the mixture of these qualities that their nature may be said to be compounded, and the most prominent characteristic trait, which they manifest, is a capriciousness and mutability of temper almost inconceivable. They are observed to pass in a few moments, and without any apparent cause, from affection to menace, from anger to love, from indifference to rage. Their passions are capable of being raised to such a pitch, as to become the means of extinguishing the vital principle within them. Many of them have been known to expire from the consequences of their fury. They present without contradiction, the most striking example of a complete development of that faculty of animal activity, called sentiment or passion. In a state of liberty, the intelligence which they possess, serves as a corrective to this tendency, or more properly speaking, a prevention of its full manifestation. They quickly recognize every thing that may be hurtful to them, and avoid it with the utmost care. Uniting penetration and dexterity, they at once discover their enemy, render his wiles fruitless, and in spite of his opposition, know how to accomplish their purposes and satisfy their desires. Thus, ferocious as they are, they never attack but from a distance, either by menacing cries, or flinging the branches of trees. Their cunning and promptitude in laying waste a plantation are so great, that the utmost vigilance and alacrity are scarcely sufficient to prevent them from executing their devastations. When danger, however, presses closely upon them, they know how to avail themselves of their natural strength and weapons. F. Cuvier relates a circumstance of one of these animals, having wounded his keeper very dangerously, because the latter had merely threatened him with a stick. He cites this not only as an instance of the

ferocity but also of the instinctive penetration of the animal. He had never been struck; a stranger to chastisement of every kind, the tone of menace, or the lifted cane could awake in his remembrance neither pain nor punishment. This action of his was the result of no idea acquired by experience,—it was the consequence of an immediate, simple, isolated act of the mind, of an untaught, natural judgment.

As these animals are susceptible of an education arising out of the circumstances which surround them, so are they likewise in some measure capable of receiving an artificial one from the hands of man.

In fact, they are sometimes to be seen in public places, amusing the people by such exercises as are performed at the command of their masters. But they submit to this kind of slavery only during the period of their youth. In maturity they not only refuse all true obedience, but most frequently lose all the docility they had acquired, and resume their natural ferocity.

The Cynocephala, possessing all the material points in the organization of the quadrumana in general, have been evidently designed to live in the forests, and make the trees their habitation. It must be observed, however, that with them this destination is much less absolute, than with the other monkeys of the ancient continent. Not having the hinder parts so elevated, they walk with more facility, though they are very far from equalling the true quadrupeds in this particular. Their motions on the earth are always constrained. Their progress is slow, and their gait a sort of trot, or small gallop. They very seldom attempt to stand erect. To do so they must have occasion to reach something, and even then, they rarely advance beyond a few paces. But on the other hand, and especially in youth, they show the most wonderful agility in climbing, and make prodigious leaps. In a moment they will traverse the

whole extent of a very large tree, assume every possible attitude, pass from one position apparently the most difficult that can be, to another still more difficult, by the most rapid and extraordinary motions, without experiencing the slightest obstacle or impediment from the multiplicity and complication of the branches. Accordingly they have but few enemies which can openly overtake and reach them. In old age they become thick, clumsy, and inactive. They constantly sit upon their callous posteriors.

The principal nutriment of these animals consists in fruits, roots, the tender leaves of trees, and the young sprouts of certain plants. When they eat, they always commence by filling their pouches, and they drink by suction, like all animals with long and mobile lips.

The countries which they inhabit are not yet known to a degree of precision, the greatest number appear to be in Africa, but India likewise possesses them. Hot climates are indispensable to their nature. In winter, they could find no means of subsistence in northern regions, nor are they provided by nature with a covering to resist the cold; accordingly, it is only by keeping them very warm, that we can preserve them in menageries.

We know little or nothing relative to the reproduction of these animals. Their development is slow. It is only towards the eighth or ninth year that they become entirely adult, and it is probable that their life is prolonged to thirty or forty years. The females are smaller and gentler than the males.

It is unnecessary to enter into any minute account of their organization. It would be but tiring the reader with vain repetitions. Of the points of interest relating to them as a subdivision enough may, perhaps, have been said. To extend the essay much would necessarily involve points revolting in the discussion and terminating in no adequate beneficial result.

On the Pongo we are in possession of little material information. The first person who gave a correct description of this animal, was the Baron de Wurmb, whose dissertation on it is to be found in the acts of the Batavian Society. He called it the Pongo, or great orang-outang. The degree and probability of its relationship with this last animal, we have already noticed. As for the Pongo of Buffon, that evidently is an animal merely imaginary, the result rather of his own erroneous conclusions from imperfect statements, than from any foundation of fact. With the true Pongo he was obviously unacquainted. Audebert has given a very complete figure of the skeleton of this animal.

By the conformation of his head, the Pongo would appear to occupy almost the last place in the numerous family of the Simiæ. He should stand where our author has placed him between the Mandrills and Alouattes. "What," says M. Geoffroi, "is most remarkable in the bony head of the Simia of Wurmb, is the excessive elongation of the muzzle; and as this considerable volume of the muzzle cannot be gained but at the expense of the other adjoining parts, we accordingly find that there is scarcely any apparent forehead, that the bony box which contains the brain is uncommonly small, and that the occipital foramen is situated as far as the posterior part of the head. The muzzle, the magnitude of which forms the principal character of this species is remarkable, moreover, not only by the enormous thickness of the gums, but also by the extraordinary size of the canine and incisive teeth, with which they are provided; the incisors exceed in magnitude those of the Lion, and the canines do not differ much in dimensions from those of the same animal. Thus, though their teeth have a general resemblance to the teeth of the other Simiæ, we might be tempted in consequence of their magnitude to class the animal to which they belong with species the most decidedly carnivorous. There is another consi-

deration which gives some support to such a classification. The occiput is elevated at its point and forms a quadrilateral protuberance very large and thick, where three bony crests are produced, not less apparent nor less solid than those of the Lion. Two of these crests are considerably elevated and extend laterally to the auricular foramina. Another extends across the vertex, and then assumes a bifurcal form, as in the Lion, above the forehead in two lateral branches, which proceed as far as the external side of the upper edge of the orbits. These little crests are decisively marked in the Simia of Wurmb, and form an equilateral triangle with the upper edge of the orbitary foramina. But these characters so extraordinary in themselves, astonish us still more by their combination with others equally strange. The head is formed like the half of a pyramid, and the auricular foramina are placed so considerably above the palatine bones, that a line let down from the former to the internal edge of the ossa palatina, would form with an horizontal line an angle of 25°."

According to these considerations, Lacepede has made a separate genus of the Simia of Wurmb, which he has named Pongo, the characters of which, independently of those common to all the Simiæ, are facial angles of 30°. abajoues, posterior callosities and want of tail. As yet we know but one species, the Pongo of Borneo.

The greater or less facility possessed by any animal for the biped motion, depends mainly on the position of the occipital foramen. In consequence of its posterior situation in the Pongo, Geoffroi considers that the natural motion of this animal must be quadrupedal. He adds, however, some reflections tending to invalidate this opinion, and though we do not entirely coincide in his conclusions, we think his speculations on this point may not prove uninteresting to our readers.

"Before," says this experimental zoologist, "we venture to affirm that the Simia of Wurmb, cannot, according to

the position of his occipital foramen, walk upright, let us consider him in his entire organization. We are not yet acquainted with all the immense resources of nature. We know not yet to what degree they can augment and utilize those organs, which exist but rudimentally in the majority of animals, so as to form a counterbalance to other organs, perhaps too emphatically developed. In fact, the organization of the Pongo, independently of the organ in question, proclaims a biped animal. The pelvis is not completely parallel to the spine. The os calcaneum has a facette, on which the animal may, like man, find a solid seat. The arms are of an excessive length, nearly reaching to the malleolus externus. This last-mentioned character, to which little attention has hitherto been paid, appears to me one of the great indications of the capacity of biped motion. The Simiæ must undoubtedly avail themselves of the length of their anterior extremities, and employ them as a balancing power to preserve or to regain their equilibrium.

"In fine, a peculiar mode of organization in this animal, is found to remedy the inconvenience for biped motion, resulting from the length of the muzzle, and the retirement of the occipital bone. In all the known mammalia, the spinal apophyses of the cervical vertebræ, are shorter than those of the lumbar and dorsal vertebræ. It is otherwise in this Simia Wurmii, and according to the judicious remark of Cuvier, the apophyses of the cervical vertebræ possess this remarkable length for the purpose of forming strong and multiplied points of attachment to the large muscles of the neck, which extend over the occipital crests. It is thus by another system of mechanism, that nature enables this animal to sustain its head on the spinal column, and consequently to support itself and move in the erect posture."

Notwithstanding the acuteness of these observations, and the high authority from which they emanate, we cannot help believing that the erect position is no more natu-

ral and convenient to the Pongo than to other Simiæ. That he can occasionally use it is certain, but that he habitually does so is far from probable. He is not better organized for this purpose than the Orang-Outang, whose insufficiency in this respect has already been amply proved. Like him, the natural organization qualifies him to use neither bipedal nor quadrupedal motion with facility, but eminently fits him for the process of climbing and the habitation of the forests.

The excessive strength and ferocity of the Pongo, renders an intimate knowledge of its habits extremely difficult. M. Palm reports, of the one which has formed the subject of our preceding observations, that when the attempt was made to take him, he defended himself so violently, with the branches of trees that it was absolutely impossible to seize him alive. We shall now proceed to the American division of the order.

Natural science is the boast of modern times, nor does the zoological branch of it form any exception to this general position. However excellent the models which the relentless and destructive hand of time has still spared for the study of the artist and the admiration of the world; however hopeless the task of surpassing the elevation of thought and felicity of expression of the poets, historians, metaphysicians and philosophers of antiquity, it is not from these that the naturalist must expect any great assistance in his pursuit. The brief notice of species to be found in their writings afford subjects of useless controversy to zoological scholars, as to the animals really intended, rather than solid and satisfactory information to the inquiring student.

One cause of this deficiency in ancient times, is obvious in this, that the great storehouse of the world was then but partially open to observation, for we find that zoological knowledge has advanced together with, and indeed in conse-

quence of, geographical discoveries. As unknown countries have been opened to our view, unknown animals have been found to inhabit them; and even at the present day, notwithstanding the improved state of knowledge in regard to the surface of the earth, there is much reason to think that zoology is almost in its infancy, especially when we reflect on the terra incognita of Africa, America, and even Asia, of New Holland and the Islands of the Pacific ocean, without adverting to the new and almost daily discoveries and wonders in fossil osteology.

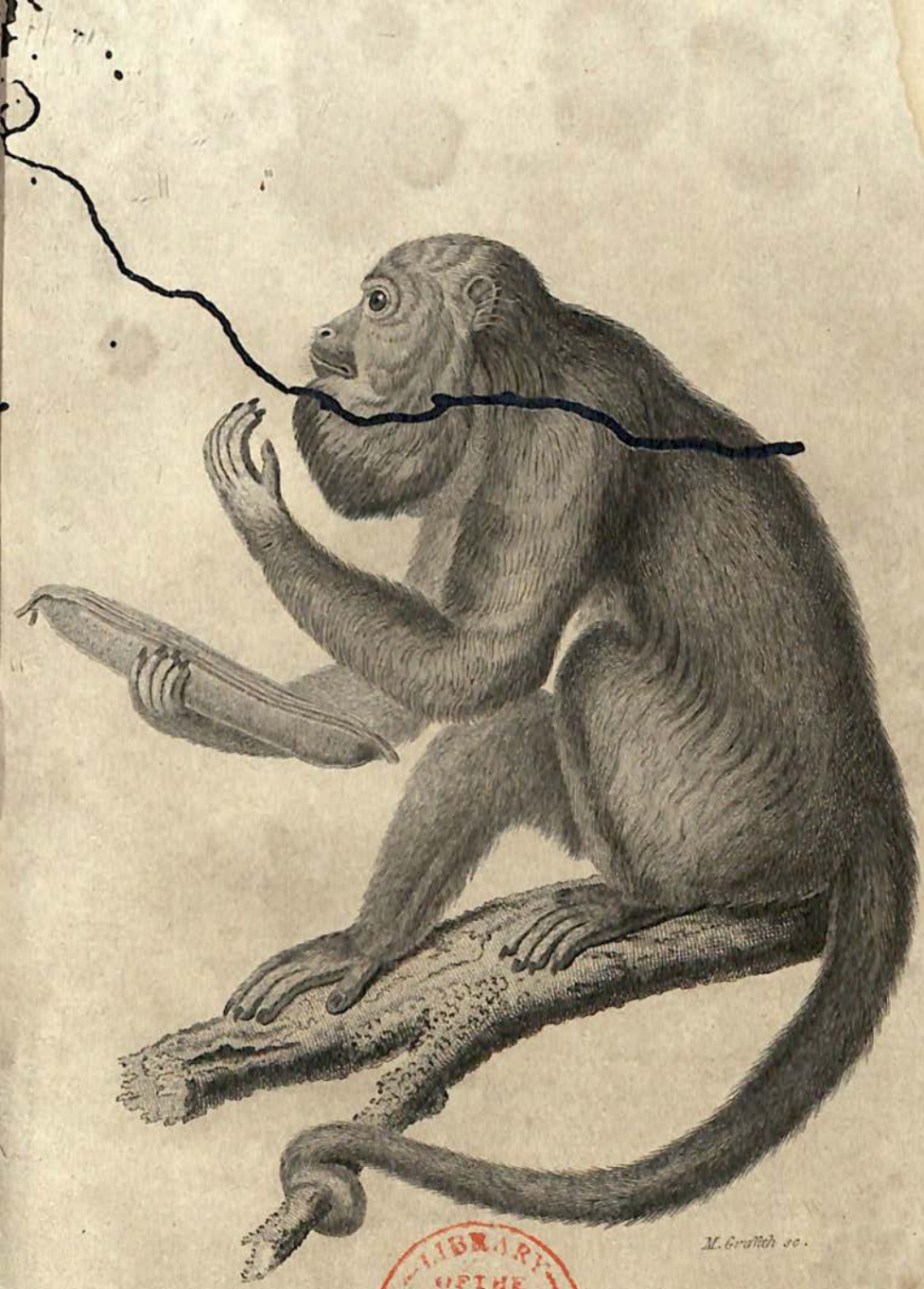
It is with the Quadrumana as with the rest of the animal creation in America. The species, however analogous with the monkeys of the old world, are very dissimilar. There are no apes or monkeys without a tail known in America, and but one species with a tail shorter than the body, which was lately discovered by the Baron Humboldt. There is no monkey known there, characterized by the callosities which with only two or three exceptions are found in all the race located in the old world; a difference in the teeth, as noted by our author in the text, also separates all these from the transatlantic division of the race; the extraordinary power of prehension in the tail distinguishes many, and lateral nostrils the whole of the transatlantic monkeys. And all the intermediate genus of Oustitis or Hapales with unguiculated nails are exclusively American. Territorial residence and physical peculiarities, therefore, accord in separating the American into a distinct group of monkeys.

Nature, indeed, in general, disclaims our systematic synopsis, and in the infinite fertility of creative power, sports with the abortive efforts of man, to reduce her works to the narrow measure of his own capacity. Systems are, however, useful if not pushed too far. But by rendering them too minute and complicated, their usefulness is destroyed. Some men appear to think that, classification is the sole end and

object of all scientific research. They pass their lives in the mere arrangement of facts, from which they draw no conclusion, and deduce no theory But this waste of time, and abuse of knowledge, not unfrequently carries with it its own punishment. Such men grow dissatisfied with their arrangements, and make new ones, which are productive of nothing but fresh dissatisfaction. It is not wonderful, if they at last abandon science with disgust, and discover that like other sublunary objects, it is " all vanity and vexation of spirit."

We shall forbear therefore, as we have hitherto done, to trouble our readers, beyond referring them to the tables appended, with the very minute distinctions insisted on by some writers; or to enter into the very circumstantial details of description, which they deem of such importance, but which are often tiresome by their particularity, and impertinent from their tautology. It will suffice to notice a few points of interest respecting some of the American species enumerated by our author, and to present our readers with a brief account of such as he has omitted. This we shall do in this, the essay department of our work, without any very precise attention to systematic order.

Though the animals of the American continent, differ in many material points from those of the old world, yet is there almost always, a general analogy between them, an analogy sometimes also observable even between the minor subdivisions. We might be justified for example in calling the Alouattes or howling monkeys, the baboons of the new world. They approximate to them in size and fierceness, and are perhaps, still less susceptible of culture, and still less amenable to the discipline of man. They are in truth distinguished for wildness and ferocity, and the bony structure in their throats, which gives to the voice such tremendous force and volume, adds in no small degree to the terror which they are otherwise calculated to inspire.



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THE URSINE HOWLING MONKEY.

S. URSINA. *Humboldt.*

London Published by George B. Whittaker Feb.y 1824.

They wander in large troops, chiefly in the night, and make the vast forest resound with their dreadful yellings. What heightens the effect is, that they howl in concert, the entire herd joining in one deafening cry, the instant they discover the approach of an intruder.

The two species mentioned by Cuvier, are so nearly allied, that some authors seem to consider them but as varieties. Humboldt, however, observes that there is considerable confusion in the enumeration by different authors of the several species of the howling monkeys; that Linnæus and Buffon mention but two, but that several distinct species of howlers are now recognised. Amongst them is the Araguata (Simia ursina, Humboldt.)

"After having landed," says this celebrated transatlantic traveller, "at Cumana in the province of New Andalusia, we saw for the first time the Araguatos, or howling monkeys, in the journey which we made to the mountains of Cocola and the caverns of Guacharo, the habitation of millions of birds of the genus *Caprimulgus*. Although the convent of Caripé is situated in a valley, the bottom of which is elevated more than 4000 toises above the level of the sea, and the neighbourhood is consequently very cold, the surrounding forests abound in howling monkeys, whose melancholy noise is heard nearly two miles off, especially when the weather is open, and the electricity in the air betokens the approaching storm.

The Araguato differs from the howling monkey described by Linnæus under the epithet Seniculus, by having longer fur, the beard less full, the head more pyramidical and smaller, the breast and belly not blackish brown, and not naked, but red and hairy like the rest of the body.

The *Stentor fulvus* of Geoffroy St. Hilaire, is yellowish all over. The Caraya of Azara, and the Guariba of Marcgrave, are also said to be different species of this family. They are sometimes found forty on a tree, the leaves as

well as the fruit of which serve them for food. In confinement they are more solid than the generality of monkeys.

The black howling monkey, or Caraya of Azara, is described at some length by that writer, who has however confounded it with the Coaita *Simia paniscus*. The native term Caraya seems to signify master of the woods, apparently from the habits of the animals—they are found in families of from four to ten individuals, every male having three or four females. The male or chief of this little state mounts the greatest elevations, apparently to watch over his subordinates who never move till he has led the way.

Azara confirms the account of the extreme difficulty of getting at these animals even with the aid of the gun; for when mortally wounded they coil the tail round a branch, and hang by it with the head downwards for days after death, and until, in fact, decomposition begins to take effect.

There are now eight species of Ateles described, viz., 1. The Chamek, a. Pentadactylus. 2. The Coaïta, a. Panicus. 3. The Cayou, which is named also Ateles Ater. 4. The Beelzebut, our author's *Coaïta à ventre blanc.* (see text.) 5. The Marginé, a. Marginatus, the Baron's *Coaïta à face bordée.* 6. The Arachnoide, a. Arachnoïdes, in our text the fawn-coloured Coaïta. 7. The Hypozanthus (Geoff.) 8. The (Melanochir. ibid.)

A few words on the group generally wanting the thumb or the fore-hands, may not be uninteresting. The Ateles (ineprfect) do not all deserve this name in its rigorous acceptation, since there are two species which possess a thumb, though in a rudimental state. They form however, a very fixed and determined group, if not by organic characters, at least by habits, manners, inclinations, and natural disposition in general. They are animals essentially formed to live in trees. When on the ground, nothing can be more awkward and embarrassed than all their motions. They drag themselves along rather than walk, ad-

vancing their long arms and legs alternately, and taking care to preserve their equilibrium, by attaching their mobile and serpent-like tail to every neighbouring object. Instead of leaning their toes or the entire sole of the foot upon the ground, and being thus either digitigrades or plantigrades, they proceed by leaning on the internal side of their fore hands and the external side of the hinder hands. This creeping gait has caused them to be compared to spiders, and accordingly we have seen that one species is named Arachnoïdes, a term sometimes applied to the whole group. But in proportion as they are slow and embarrassed on the earth, so are they brisk and agile in the trees. They traverse them even to the smallest branches, with the most inconceivable activity and address.

They dart from one tree to another even when they are separated by no small interval, and as they subsist principally upon fruits, they seldom find occasion to descend to the ground, except in search of water.

They live in numerous troops, and mutually succour each other in the moment of danger. When they meet with any one, in those sequestered places, where they have not yet learned to fear man, or fly from him, they approach and pelt the intruder with the branches of trees, and not unfrequently with their own excrement. They act thus without doubt, every time they perceive a new being, and by the impulse of an instinct, the object of which seems rather to disturb than to menace or to hurt. They seem to act without anger, and to intend nothing but the removal of the intrusive stranger, and doubtless with the generality of animals, their mode of proceeding is found completely to answer the purpose. When they are hunted, and one of them is wounded, they all fly to the summit of the tree sending forth the most lamentable cries. The wounded animal puts his fingers to the part, and looks steadily at the flowing of the blood, until through weakness he loses all consciousness and expires. He usually then remains suspended to

the tree, if, which is common, his tail should fasten on a branch; for a singular peculiarity of this organ is to contract at its extremity of its own accord as soon as it is extended to its full length.

These animals are very easily tamed, and caresses and good treatment render them extremely affectionate. We are even assured, (but it appears doubtful.) that they are capable of being taught to execute many domestic services.

This subgenus is distinguished by the external characters of a round head, long limbs, voluminous abdomen, and long prehensile tail.

From the structure of the monkey tribe, more especially from the conformation of their limbs, we are in the habit of associating with them, the ideas of petulance and activity. The general length and suppleness of their members, and the lightness of their bodies, naturally lead us to presuppose that quickness, vivacity and address, which in fact they very usually exhibit. Were we desirous to represent an animal of sluggish movements and of feeble and irresolute efforts, we would depict it with short limbs, and a thick body. We always seek to explain the greater or less facility of action in any animal by the organization, the arrangement, the relative character of its bones and muscles. Should we find an animal favourably organized for active exertion, yet slow and embarrassed in his motions, we should regard it as a lusus naturæ. But in science, a single new observation is often sufficient to overturn rules established to all appearance on the most solid foundation, and we often find that what we had been accustomed to consider as necessary is only contingent. Thus for example, the Coaïta, or four-fingered monkey, better conformed for active and vivacious motion than most of the tribe, which has longer limbs, and a tail which may be considered as a sort of fifth hand, moves in general with extreme slowness, and seems as it were "to drag his lazy

length along." His limbs seem to quit their position with pain and difficulty, and he appears to need a new impulse of the will for every new movement. One would almost imagine that the intellectual principle which acts with so much slowness, was something peculiar, something different from that which animates other well-organized material forms, and impels them into exertion and activity. Yet this animal is far from being devoid of intelligence. He possesses it in as high a degree as any other of the quadrumana, and in a higher than those which are most distinguished for the restless petulance of their motions. He also unites to this very considerable degree of penetration, the mildest and most affectionate disposition.

The prehensile tail is a very extraordinary provision of nature. In the Coaïta it is upwards of two feet in length, nearly a foot longer than the body of the animal. It nearly answers all the purposes of a hand. This monkey employs it for the purpose of handling and grasping objects, of drawing things towards him that are too remote to be reached by his hands, and of suspending himself from the branches of trees. The prehensile part of the tail is naked, and has a second covering of very delicate skin, which forms an organ of touch as perfect and discriminating as the hands. In all its movements the animal entwines this tail round the objects near it, as if to guard against a fall, in case the bodies on which it leans should escape from beneath its feet.

The Coaïta is found in large troops in Guiana and Brazil, in the forests, suspended to the branches of the trees.

Another species of the Ateles described by Humboldt is the Marimonda (*Simia Beelzebuth, Humboldt.*) This species is nearly allied to the Coaïta (*Simia paniscus*) but is certainly not the same or a mere variety. The fur is of a blackish brown colour, very shining on the upper parts. The direction of the hair on the head is very remarkable,

that on the occiput and at the top is directed forward, while that of the forehead is directed the contrary way, making a *toupet* on the top of the head. The lips which are capable of considerable extension, and the tip of the nose are of a reddish white, the rest of the face is naked and black; the belly, inner sides of the limbs, and under part of the tail are covered with yellowish red hair, the points of which when viewed in the sun have a slight golden tint.

This animal is in general about two feet nine inches in height when erect; Humboldt observes that to the east of Mount Duida, in the fertile country comprehended between the small rivers, the Sodemoni and the Gehette, all the productions of nature, animal as well as vegetable, attain large dimensions, and that he saw accordingly in this part a specimen dried for the purposes of a festival, which was much larger.

The Marimonda, like the common four-fingered monkey, (*Simia paniscus*) is extremely slow in its movements, of a gentle character, melancholy and fearful. In the excess of its fears it frequently bites those who caress it; its passing anger is bespoke by its closing the lips to utter a guttural cry *ore-o*. Naturalists have compared the tail of the Ateles in general to the proboscis of the elephant; they have assured us that the animal fished with its tail, that it could take up a straw with it, and that its touch was so delicate that it appeared as if the eyes of the animal were seated at the end of this organ. Humboldt thinks that the tail of this species is the most perfect in this respect, but he never observed that the animal used the tail as a hand to convey fruit to the mouth. When the Marimondas are collected in numbers, they embrace each other, and form a knot in a very whimsical manner. Their attitudes bespeak the utmost listlessness, and idleness. Their joints are so free that they appear from the attitudes the animal assumes, to be dislocated. Exposed to a vertical sun they will lie on the

back, fold their arms on the back, direct their eyes upwards and remain immoveable in this extraordinary position for hours.

Brisson appears to have been the first who described that curious animal the horned Sajou. He had seen it alive. Linnæus established it as a species in his *Systema Naturæ*, under the name of *Fatuellus*.

The first figure of the horned Sajou, taken after a living individual, was published by F. Cuvier in 1820, in his folio work on the Mammalia.

The horned Sajou arrives at a more considerable size than the others. He is of a soot-coloured brown, nearly black on the head and limbs, more pale on the shoulders and arms. His cheeks are furnished with white hairs, which extend in a very narrow line under the chin; all the naked parts are of a violet colour, and the skin itself, which is covered by the fur, is of a similar hue. The hairs on the forehead, instead of lying back, like those of the head, rise vertically and form a bandeau, terminated at each extremity by a bunch of hairs, much longer than the rest, and which have given rise to the specific appellation of the animal. All the lower parts of the body are much less furnished with hair than the upper, and these last are still better covered in winter than in summer. At that period the horns increase, the hairs of the cheeks grow more, and the whole animal augments so considerably in volume, that he is in some measure disfigured. The horns do not appear until the Sajou has cut his canine teeth, which with him is the period of adolescence.

This animal is by nature very mild and affectionate.

F. Cuvier notices a variety of the horned Sajou which differs little from the one now described, except in certain shades of colouring, and in having two crescents of white hair above the forehead.

The Saïmiri, or Squirrel monkey, is a beautiful and ele-

gant little animal found in Brazil, Cayenne, &c.: at its full growth it probably measures about a foot from the origin of the tail to the extremity of the neck. The tail itself is longer. The upper parts of the body are of a greenish yellow, which turns to a greyish tint on the arms and thighs, and a fine orange on the fore arms and legs.

The tail greenish, excepting the end which is black. The belly, breast, neck, cheeks, &c. white, a little greenish spot is found in the middle of the white of the cheeks. The eyes are brown. The four hands are formed with great exactness, the nails of the thumbs are flat and large, and those of the fingers are straight.

This animal is gentle and vivacious. The one described by F. Cuvier, did not employ his tail for handling objects. He was, however, in the habit of winding it about them when they were placed conveniently for that purpose, but without grasping them, and the tail may therefore be said to be subprehensile. He used to sleep in a sitting posture with his head between his legs, which then touched the ground; when he handled a body with his fore feet, the thumb was placed parallel to the other fingers; it was only in the hind feet that the thumb was opposable.

His cry was a kind of hissing noise, with a gentle and slender sound, which he would repeat three or four times, for the purpose of expressing his anger, or his wishes.

F. Cuvier gives a pleasing account of two Ouistitis or striated monkeys and their little offspring born in the Menagerie at Paris. On the 27th of April, 1819, the female brought three young ones, a male and two females. On coming into the world their eyes were open, and they were covered with hair of a deep gray, very smooth, and scarcely perceptible on the tail. They instantly attached themselves to the mother, embracing her closely and hiding themselves in her fur. However, previously to their sucking, she managed to eat the head of one of them. The two others took

the breast, and from that moment, the mother bestowed on them the natural attention of a parent, and her cares were shared by the father. Every thing that Edwards reports concerning a couple of these animals which produced in Portugal is confirmed by M. F. Cuvier. When the female was fatigued in carrying the little ones, she would approach the male, send forth a little plaintive cry, and immediately the latter would take them with his hands, place them under his belly, or upon his back, where they would hold fast of themselves, and thus he would carry them about, until the want of sucking rendered them uneasy. Then he would return them to the mother, who got rid of them again as soon as possible. It was upon him, indeed, that the principal burden of their care seemed most generally to fall. The mother did not evince for them that degree of tenderness and affection, so usual in the females of most species. The second died in about a month, and the third lived only to the middle of the following week. The cause of this was that the mother soón completely lost her milk. The female of this species was a little larger than the male, but similar in colours. The tuft of white and stiff hairs surrounding the ear, gives a very peculiar cast to the physiognomy of this animal, contrasting strongly with the black head.

The young Ouistiti differed from the adults both in general form and colours. The head was large in proportion to the body, and the posterior part of the latter very small. Its entire fur was of an uniform blackish gray. This young animal did not live long enough to afford many opportunities of observation; near the end of his life, when his father was fatigued in carrying him, and his mother would receive him no more, he would mount to the top of the cage. Having got there, and being unable to descend, he would send forth a cry of distress, which occasionally revived the solicitude of his parents, who would then

go to his assistance But more generally, they remained deaf to his cries, and he would often have fallen to the ground, but for the assistance of the attendants. When he was altogether abandoned, an attempt was made to suckle him artificially. He drank; but other cares, which none but his parents could afford him, were necessary, and he perished for the want of them.

The adult Ouistitis never showed much intelligence. They appeared extremely suspicious and very attentive to what was passing around them, and to judge by the vivacity of their looks one might suppose that their penetration was great. However, they had no discrimination of persons, mistrusted all, and menaced indifferently with their bite, those who fed them and those whom they saw for the first time They were evidently incapable of affection, but extremely subject to anger and irritation. Under the influence of fear, they would fly to conceal themselves, uttering a short but piercing cry. At other times, and without any apparent motive, they would send forth a sharp sort of hissing sound, singularly prolonged in one key. They exhibited but little vivacity or agility in motion. They used much precaution in ascending and descending in their cage.

The squirrel, with which these animals have many relations, is, however, much superior to them in activity, and not far removed in degree of intelligence. The size of the adult Ouistiti is about seven or eight inches at most from tail to occiput. The tail itself about a foot in length.

The Marikina is a pretty little animal which has often been brought into Europe. Its elegant form, graceful and easy motions, beautiful fur, intelligent physiognomy, soft voice, and affectionate disposition, have always constituted it an object of attraction.

The Marikina, or silky monkey, can be preserved in

European climates only by the utmost care in guarding it from the operation of atmospheric temperature. The cold and humidity of our winters are fatally injurious to its health. Neatness and cleanliness to a fastidious degree, are constitutional traits of the Marikina, and the greatest possible attention must be paid to it in this way, in a state of captivity. The slightest degree of dirt annoys them beyond measure, they lose their gaiety, and die of melancholy and disgust. They are animals of the most excessive delicacy, and it is not easy to procure them suitable nourishment. They cannot accustom themselves to live alone, and solitude is pernicious to them in an exact proportion to the degree of tenderness and care with which they have been habitually treated. The most certain means of preserving their existence, is to unite them to other individuals of their own species, and more especially to those of an opposite sex. They will soon accustom themselves to live on milk, biscuit, *&c.*, but mild and ripe fruit is most agreeable to their taste, which to a certain degree is also insectivorous. Their mode of living in a state of nature is little known, but resembles in all probability that of squirrels. Like those, it is probable that they dwell mostly in trees, whose thick foliage in their native climates affords a secure and sheltering retreat. If we may judge of an animal's natural habits from observing it in a state of captivity, we should say that the Marikina had no fixed nest or abode, to which it repaired for the purposes of repose. All animals which in a state of nature have any fixed retreat of this kind, are endowed with the instinct of keeping it in a state of extreme cleanliness. The Marikina in the French Menagerie, mentioned by F. Cuvier, had not this quality. Most probably he had lost it by the effect of slavery, which is always more or less injurious to the development of natural instincts.

This animal would conceal himself when affected by the

least apprehension, and express his fears by a prolonged hissing noise. He loved to receive caresses but never returned them, and though he testified some affection, he never exhibited complete confidence in those about him. He would come, however, at the call of those he knew, and fly from the voice of strangers, regarding them with mistrust and menacing them with his feeble teeth. These are the only arms afforded by nature to the Marikinas. By agility and precaution they escape their enemies more than by their strength, which would scarcely be sufficient to protect them against birds of prey of the smaller kind. Like birds, the Marikina just mentioned was fond of remaining at the top of his cage. He seldom descended and always backwards. He made use of his forehands in handling objects, though he had no distinct thumb and did not claw them with his nails. He never walked upright, and his tail was of no use but remained always pendent.

The Marikina is not quite a foot in length, and the tail about that length. This animal is the Silky Monkey of Pennant.

The Squirrel monkey or Titi of the Orinoco (*Simia sciurea*, Linnæus.) This very pretty little animal is called *Bitschetschis* and *Bititenis* by different tribes of the native Americans. The fur is of a golden yellow colour, and the animal is not larger than the last. It exhales a slight scent of musk. The physiognomy may be called infantine; with the same expression of innocence, the same unruffled smile, the same rapid transition from joy to sadness. If it cannot laugh, the peculiar faculty of man, it can weep; and when its fears are excited, the eyes become suddenly suffused with tears, and it seems to appeal only to the softer passions for impunity and protection. Irritation seems almost a stranger to it. At other times all its movements are rapid, light, airy, and graceful. It has a habit of steadfastly watching the mouth of a

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THE DOUROUCOULI.

SIMIA TRIVERGATA.— Humboldt.

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person while speaking, and if it be allowed to sit on the shoulder will frequently touch the lips, teeth, or tongue. Like many of the small American monkeys, it is extremely fond of insects. During damp or cold weather, in the forest, or when several of these animals are in a cage, they crowd as closely together as possible, embrace each other with their arms and with the tail, which seems to have induced an erroneous idea that their tail is prehensile. They are difficult to domesticate, and fetch a considerable price.

The Douroucouli (*Simia trivergata* of Humboldt) is one of the most remarkable and insulated of the quadrumanous race. We were first made acquainted with it by the Baron Humboldt. It is by its manners rather than its physical traits that it is so distinct from other monkeys, and had we not the authority of so great a scientific scholar as Humboldt, we might well doubt the reality of its belonging to the monkey race. The same author, however, while he has discovered and described many new species of the quadrumana has also more completely displayed the imperfect state of our knowledge in respect to these and other animals. The several species he describes were found exclusively located, and within very narrow limits; and when the immense tracts of the earth's surface, not only in America, but elsewhere, which have not been visited by Europeans or men of science, are considered, we may well conclude that our present zoological catalogues, however extensive, are still but very partial.

Humboldt separates the Douroucouli into a distinct family under the name of Aotes (αωτοι), consisting of this single species. Under the impression that artificial grouping of the animal kingdom, which in due bounds is of the greatest assistance to the memory, becomes burthensome and oppressive rather than serviceable to that faculty when carried too far, we cannot but think that the appropriation

of a single species to a separate family is objectionable, particularly when the grounds of such separation rest upon personal manners and habits, rather than on physical difference or anatomical variations. A probable presumption may be raised by analogy with other animals that there are other species of nocturnal monkeys not yet known to us, but until that presumption be realized it seems enough to treat the Douroucouli merely as a sagoin of singular habits.

The hair of the body of this animal is gray mixed with white, and has a silvery lustre in the sun; a brown line passes down the middle of the back. The breast, belly, and inner sides of the limbs are of a yellow orange colour, inclining to brown. The head, especially the forehead, is marked by three black diverging lines. The face, which resembles that of the tiger cat, is covered with blackish hairs. The eyes are of an enormous size when compared with the animal, and are of a bright yellow colour. The nose is black and divided into two equal parts by a white stripe; two white spots are placed above the eyes. The mouth is surrounded with short white bristly hairs. The interior of the hands is white. The nails are more flat than in the Sagoins in general. The tail is handsome, bushy, and about half as long again as the body, corresponding in colour with the back, except that the extremity of it is black. There are no external ears, but on opening the hairs two large lateral cavities are seen which are the organs of hearing. The length of the body without the tail is nine inches and half.

The vermiform shape of the body of this animal, in unison with some of its habits, seem to indicate an approximation to the viverræ, particularly the v. caudivolvula of America. Such approximations from one genus to another we shall have frequent occasion to notice.

The Douroucouli is a nocturnal animal. The Baron

Humboldt states of the individual in his possession upwards of five months, that it slept generally from nine in the morning till seven in the evening; light was extremely inconvenient to him. When about to sleep he hid himself in the darkest recess or crevice he could find, and like the squirrels and weasels, seemed to have a particular facility in passing into small openings.

If he awaked during day he was sad, lifeless, and stupid; and exhibited considerable difficulty in opening his large eyes, which at night resembled those of the owl though during day they were spiritless, and as if dying. His ordinary position for sleep was that represented in the plate.

The listlessness and apathy of this animal during day is only equalled by his impetuous activity at night. Nearly blinded by the excess of day-light he seeks his food during dusk, when he hunts after small birds and insects, indeed his love of flies will sometimes keep him awake for a short time in the day, provided he be in a situation sufficiently obscured to permit his seeing them. Fruits, almonds, sugar-cane, *&c.*, also furnish him with food, but he is, however, by no means a great eater, and will go twenty or thirty days without drinking.

The Douroucoulis live in pairs and not gregariously—they are often taken in the day-time out of small clefts in trees, into which they have retired to sleep away the day. They are extremely difficult to tame, at least the individual in the Baron Humboldt's possession, could not be reconciled by any means. He played but very rarely, and occupied himself either with his own person or in the taking small flies, which he caught with peculiar address. He hissed like a cat, pushing out or striking with his paw at the same time with great rapidity. His nocturnal cry (*muh muh*) resembled that of the Jaguar of America. His voice was extremely powerful in reference to his size. He also uttered two other cries, a sort of mewling (*c-i-aou*), and a dis-

agreeable guttural sound (*quer quer*); his throat became inflated when he was irritated, at which time he was not unlike a cat when attacked by a dog.

The singular habits of this animal, especially his nocturnal propensity, analogous to some of the Lemurs, and his partially carnivorous regimen, seem to raise a strong presumption against the accordance of his physical peculiarities with those of other monkeys, in answer to which we have the authority of his illustrious describer that they do. No opportunity has yet been afforded in Europe of anatomical investigation.

The Capuchin of the Orinoco, (*Singe cheiropotes*, Humboldt,) is also brought to light by Humboldt. It is the *Mono capuchino* of Spanish Guiana, and differs essentially from the *Simia Capucina* of Linnæus, the Sai or Singe pleureur of Buffon. It is to be regretted that naturalists should have applied the name Capuchin to a beardless animal, as the appellative applies infinitely better to the species now under consideration as a descriptive denomination.

This species is nearly the size of the four-fingered monkey (Simia paniscus). Its colour is reddish brown; its hair is long and smooth. The head has the form of a lengthened oval, describing a facial angle of about 52°. The face and hands are black and naked. The forehead and top of the head are covered with thick long hair, directed forward and parted above the eyes into two thick distinct tufts. This singular division is formed by a longitudinal line, without hair, separating the two tufts. Its eyes are large and deeply seated. The openings of the nostrils are distant from each other. The canine teeth are of an enormous length and size. The beard is blackish brown, it springs from below the ears and covers a part of the chest. The head, thighs, and tail, are deeper in colour than the rest of the body. The nails are slightly bent, with the exception

of the thumb; the nail of which is perfectly flat and round. The bushy tail is rather shorter than the body.

This species is said by Humboldt to resemble man more than any other of the American monkeys. Its eyes have an expression of melancholy, mixed with ferocity. The chin being hidden under a long and bushy beard, gives to the facial angle an appearance of being less inclined than it really is. It is a robust, active, fierce, and untameable animal. When irritated it raises itself on the hinder extremities, grinds the teeth, rubs violently the end of the beard, and flies at the person who has excited it. It is habitually melancholy, and when in captivity is never excited to gaiety except for a moment at the sight of its favourite fruit. It seldom drinks; an operation it performs in a singular manner, not by putting its lips to the liquid or the vessel containing it, but by taking it up in the hollow of the hand, and conveying it to the mouth while the head is inclined on the shoulder, whence Humboldt applied the epithet cheriopotes, or hand-drinkers. It is not easy to witness this performance, as the animal is unwilling to do it when observed. It has an extreme aversion to having the beard wetted, which probably induces its singular mode of drinking.

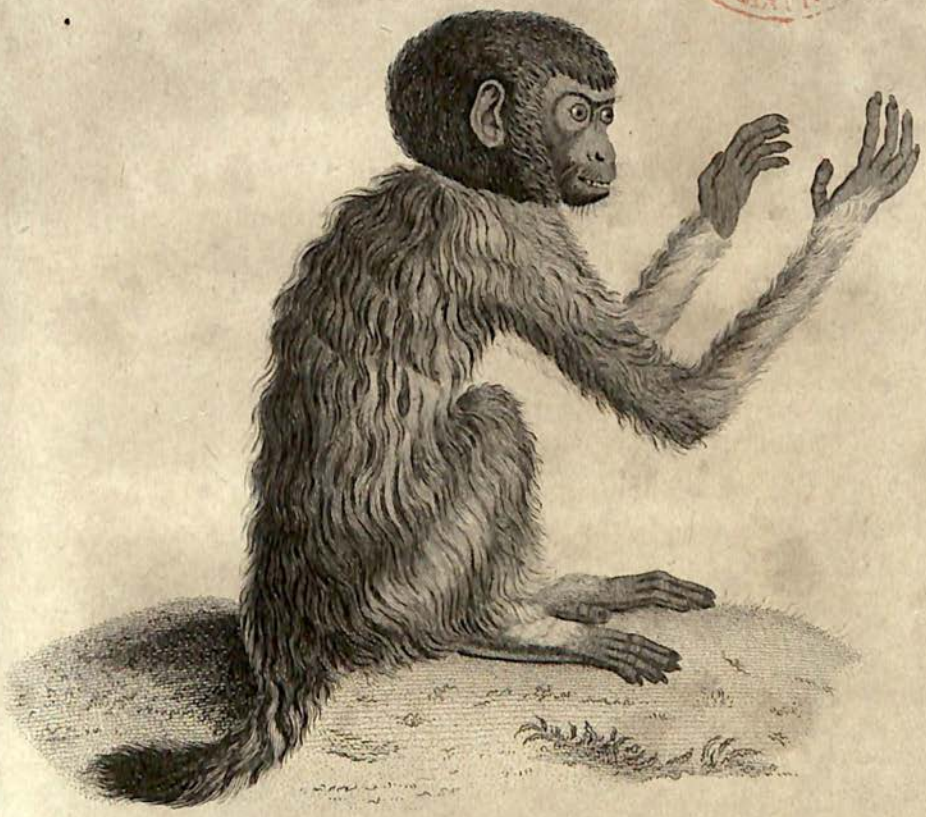
The Capuchins of the Oronoco do not live in troops but only in pairs They seldom use their voice, which is a rough grunt. There appear to be other species, to which the natives of different parts of South America have applied this name from a fancied similarity to the monks it refers to; the antipathy formerly existing between the *Observantins* Missionaries of the Oronoco and the *Capuchin* Missionaries, have given rise to very absurd stories in regard to the animals in question, to which Humboldt alludes. Till these men can agree in their opinions there is little probability of their advancing the progress of sound religion, charity and truth.

The Couxio, (*Simia Satanas*, Hofmannsegg). The only monkey with which the Capuchin of the Oronoco can be confounded is the present, described by the Count Hofmannsegg*. Though this bears a general resemblance to the last, it differs, 1. In colour, which in this, in the adult animal, is black or brownish black, instead of red inclining to brown. 2. In the hair of the back, which in this is much longer. 3. In the chest, which is almost naked. 4. In the long hair of the head not being divided or parted. 5. In the tail being thicker and more bushy, and 6. In this circumstance—that the young Couxio is of a brownish gray instead of being of a red colour, which, as it is said, is proper to the young Capuchin. It measures about two feet nine inches from the top of the head to the extremity of the tail.

The Cacajao, (*Simia Melanocephala*, Humboldt). All the American monkeys, known previously to the Baron Humboldt's enterprising travels, have the tail either rather longer than the body or about one third less in length—there were neither apes, as that word was originally applied, that is, monkeys without tails, nor were there baboons or monkeys with short tails known, proper to that continent. This circumstance renders the more interesting the discovery by Humboldt, of a short-tailed American species—one which is in that respect among the monkeys of the new world, what the Magot, (Simia inuus), and some others, are among those of the old.

The species in question among other synonyms has one *Mono feo*, signifying the hideous monkey, and another *Mono rabon*, the short-tailed monkey, by the Missionaries; it appears, nevertheless, not to be at all a common species. The specimen described by Humboldt, measured a little more than one foot five inches, from the top of the head to

* In the Magasin de la Société des Scrutateurs de la Nature, April, 1807, Berlin.



THE CACAJAO. HUMBOLDT.

London, Published by George B. Whittaker, May 1824.

the end of the lower extremities, but he was informed that they do, when adult, attain above one foot more: the tail is three inches long.

The head of this animal is not much like that of a monkey, being oval, but flatted at the two sides. The face is very human, naked, and of a deep black colour. The eyes are large, deeply seated, and brownish black in colour. A few stiff black hairs are found about the eyelids, mouth, and chin. The cleft which separates the nostrils is very large. The chin is beardless; the ears are naked, large, and very human. All the body, with the exception of the head and fore hands, is covered with a yellowish brown fur. The hairs are long, and shining. The fingers are long, the nails flattish, and the tail is thick, coloured like the back, short and almost naked towards the extremity.

The Cacajao is a phlegmatic, inactive, weak, but very docile little animal. He eats greedily all sorts of fruits even the sourest; these he will seize when offered him by stretching out both his hands at once, bending his back and body at the same time into the attitude represented in the plate. His fingers are very thin and long; he handles his food with little dexterity, and eats altogether very awkwardly. He is much annoyed by the petulance of other monkeys which disturbs the natural quiet of his disposition. When irritated, which however, is but seldom, he opens his mouth in a strange manner, and his face becomes disfigured by a sort of convulsive laugh.

Humboldt naturally suspected that the individual in his possession might have lost a part of its tail by accident, or by eating it, as is known to be done by some of the monkeys of the old world; but he was assured by many of the natives that it was not so, and that the shortness of the tail is a distinctive character of the species, from which, indeed,

it was named by some. They are gregarious about the Cassiquiare and the Rio Negro. The Baron's specimen died from a coup du soleil, which, was not mortal on the instant, but followed by indigestion.

The Viudita, or Widow monkey, (*Simia Lugens*, Humboldt). With the exception of the Douroucouli, or nocturnal monkey, there is perhaps no species which differs more in his manners and habits from the genus than this, called by the Indians *Macavacahon*. It measures more than one foot from the nose to the insertion of the tail; seldom stands on its hinder extremities only, and resembles, when seen at a distance, a little black dog with a white face.

The Viudita has the head round, the muzzle short, and the physiognomy with an agreeable expression: the hair is soft, shining, and smooth; uniform in blackness with the exception of the face, neck and fore-hands, which are whitish, the face being surrounded with a narrow belt of purer white. The nose is short and flat, and the nostrils are lateral and very large; the ears are pretty and nearly naked; the anterior hands are white on the outside but black within, and the posterior are altogether black like the body. The Creoles compare the whiteness of the face, neck, and fore-hands to the veil, handkerchief and gloves of the widow in mourning, whence it is named. The tail is black and a little longer than the body.

The character of this pretty little animal is in no wise displayed in its appearance. It has a very gentle, timid, and innocent air, and will remain motionless for hours, watching attentively whatever is going on, and is particularly unwilling to have its hands touched, which it immediately, on doing so, withdraws and hides under the belly. This timidity and this gentleness, however, are deceitful and in appearance only: alone, unrestrained, and unobserved, the Viudita becomes furious at the sight of a small bird,

flies at it like a cat, and devours it in an instant. At this time it has all the appearance of one of the weasel tribe rather than of a monkey. This and the Douroucouli, however, are not the only Quadrumana that will eat flesh with avidity, as well as fruit, the common aliment of their congeners; the black Tamarin, (*Simia Midas*), and probably some others of the smaller American sort, will eat it raw with the avidity of the carnivora. The Viudita has a great dread of other species of monkeys, even the smallest Whether it be gregarious or otherwise does not appear.

As we do not profess to enter into minute details concerning all the species described, which would be uninteresting and full of repetitions, we shall now close our remarks on this part of the Quadrumana, and refer to the synoptical table of all the species which compose the order, for the generic and specific characters which separate them from others.

Supplement to the Lemurs.

As the Apes, standing at the head of the Quadrumana, seem, physically at least, to form the connecting link between all the lower animals and man, so the Lemurs may be considered as the last connecting link between the quadrumana and the genuine quadrupeds. With the exception of the quadrumanous conformation, they have little in common with the Simiæ, corporeally, and still less intellectually.

These animals being for the most part nocturnal, Linnæus, in reference to the Roman mythology, called them lemurs or ghosts.

We shall proceed without further preface, to notice such of their species and varieties as present any points of interest, without referring to scientific detail and arrangement further than has been already done by our author in the text, and as appears in the synopsis appended.

We shall likewise confine ourselves to such facts as may be deduced from the latest and best authenticated sources; avoiding, for the sake of brevity, the repetition of particulars, however amusing, to be met with in popular writers, and omitting to notice, otherwise than in the table appended, many which are designated by different writers as distinct species, though probably mere accidental varieties, or differing only in sex.

The dwarf Lemur, or *Maki nain*, mentioned by Cuvier in a note, presents very strong analogies to the Makis properly so called; and at the same time exhibits characters peculiar to himself, and remote from them. His short muzzle, round head, and mode of life, altogether nocturnal, indicate a nature a little different from that of these animals, and though he should not be separated from them to be placed as another genus, he ought certainly to form the type of a group to which in all probability some species yet to be discovered may be united at a future period. Like most others of the tribe, this Lemur is found in Madagascar. His organs of locomotion are similar to theirs, even to the very crooked nail of the second finger of the hind hands. His tail is not so well furnished with hair. His ears are well rounded, but without helix; they have a tragus and ante-tragus. His eyes are very large and with round pupils. The nostrils are surrounded with a sort of broad muzzle, on the sides of which they open, and they are more advanced than the jaws. The tongue is soft. All the body except the muzzle and extremities of the limbs are covered with a thick fur, composed entirely of hairs of a silky appearance, strongly figured, which form a clothing for the animal equally soft and light. The fore-head, the hinder part of the head, the upper part of the neck, the shoulders, and the upper part of the arms; the back, sides of the body, the crupper, the thighs, the legs, and the en

tire tail, are of an uniform grayish fawn-colour. The under part of the lower jaw, the throat, under part of the neck, the sides of its upper part, the breast, the internal face of the arms, the belly, &c., are white. The hands and face are flesh-coloured, between the two eyes, there is a longitudinal white spot, bordered on each side with a little black. There is no difference between the males and females.

The Dwarf Lemur, described by F. Cuvier, used to pass the whole day in a nest of hay, rolled up in a ball, in the most profound slumber. But the moment night commenced, he would sally from his retreat and pass the time in a state of action until morning. It was then he used to sit, satisfy all his wants, and play. Few animals jump with more liveliness and activity. He would traverse his cage with a rapidity similar to the flight of a bird, and leap vertically from the ground to an elevation of six or eight feet. Fruit, bread and biscuits, were his usual food. The nocturnal life of this species is in accordance with the extreme sensibility of their eyes to the light. The little which remained during the night seemed quite sufficient for their purpose; that they see at this time every object distinctly, is evident from the fact of two of them having escaped from their cage, traversed the quarter in which they were enclosed, and which was filled with a crowd of other cages and animals, and re-entered by the little hole through which they had come forth. This they did without suffering the least accident, though the most profound darkness reigned in the place, all the shutters being closed.

The ordinary length of the dwarf lemur from tail to occiput, may be about ten or eleven inches, and the height to the shoulders about six.

This Lemur seems to be what Buffon calls the Madagascar rat, and which in scientific catalogues has received the name of "*Lemur Murinus*." Brown in his illustrations

seems to have pointed out this animal under the name of "the little Macauco."

The best and perhaps only correct account of "the red Lemur," is due to M. Peron. Commerçon, during his residence at Madagascar had made a drawing of this Lemur, but it remained unattended to, among his papers which were sent to Paris after his death, until Peron on his return brought with him a stuffed figure of the animal. This drawing of Commerçon was accompanied with no corresponding description of the species, which was the cause of its being treated with so much neglect. Travellers, should always unite figures and descriptions of such new animals as attract their attention; one is necessary for the explanation of the other, and both for the verification of the species.

An individual of this species was in Mr. Bullock's late valuable collection. It was a female, and of the most beautiful of the lemur kind. It was equally distinguished for size, for brilliancy and contrast of colours. Our author seems to think that the males of this species like most others of the lemurs may differ from the females in some of the colours. All the upper parts of the body, head, &c., are of a beautiful maronne colour, the under parts and the tail altogether of the deepest black, which is also the colour of the skin of the face, and of the four hands. A large white spot covers the nape of the neck, and another transverse one of the same colour; is found on the middle of each foot, the hairs which cover the cheeks, and surround the ears, are somewhat of a paler maronne than the rest. The eyes are yellow.

It may be remarked, that very few animals have the under parts of a deeper colour than the upper; until this lemur was observed, the grison alone exhibited this deviation from the general law of colour

The red lemur, is easily tamed, of a gentle disposition, but notwithstanding its great agility, it is habitually melancholy and sleepy. It passes the day rolled up, with its head between its legs, and seems never to awake except at the call of hunger. It measures about one foot and an inch from tail to occiput, and its greatest height from the ground is about the same. The tail is nearly twenty inches long.

The characters of the lemur with white forehead were first given by M. Geoffroi St. Hilaire, and Audebert published a figure of it in his "Hist. Nat. des Singes," from the stuffed specimen which M. Geoffroi had made use of. The existence of the species thus rested on a single individual. M. F. Cuvier, in 1816, received two lemurs with white foreheads which were males, and he joined them to two female lemurs, whose heads were entirely of a deep gray, for the purpose of ascertaining if they were of the same species. This fact he considers as clearly established by the conception of one of the females, and lays it down as a rule that the male differs from the female in colour, which he seems to think also holds good for all the species of this sub-genus.

The general colour of this lemur is a brownish maronne, and the female differs from the male only in having those parts which are white in him of a deep gray.

The female mentioned by F. Cuvier, brought forth a young one which lived, and thrived very well. Previous to this event she had been extremely gentle and familiar. She would constantly approach to receive the caresses and lick the hands of her visiters. But after the birth of the young one, she became suspicious, avoided every one and even threatened those who came near. This mistrust, however, was weakened by degrees, and her former familiarity returned, when her maternal cares ceased to be necessary. This was the case towards the end of the third month.

Until then these animals were not separated, and if the

little one ever dared to detach itself from its mother, it would return at the slightest noise to conceal itself in her fur.

We may observe that the circumstance of this female bringing forth, and suckling her young one, exactly as if she enjoyed perfect liberty, is of very rare occurrence. Wild animals, except when a state of captivity has from long habit become to them almost a second nature, rarely couple, and still more rarely prove productive. From several important phenomena, we may consider that nature does more for the continuance of species than the preservation of individuals; but it is equally evident that a state of liberty is essential to this continuation. In the case before us the animals had been accustomed to confinement from their earliest infancy. But, in general, slavery utterly effaces or perverts the natural instincts of all the wilder tribes.

When we consider, in an elevated point of view, the entire class of the Mammalia, and attempt to recognize the position which each species occupies on the surface of the globe, we contemplate a picture well calculated to excite a lively desire of knowledge, and to awaken that enthusiasm of research resulting from the view of striking phenomena, whose causes and connexion are as yet unveiled.

Few animals should excite a sentiment of this kind more forcibly than the Lemurs. They are as imperfectly known as the almost single and singular country which they inhabit, the Island of Madagascar. Their relations also with the other Mammalia, are too remote, to render any conclusion from the nature of one to that of the other, satisfactory, or even probable.

Accordingly, all that can now be said of the Lemurs, should be considered as nothing more than notes, which united with successive observations may furnish the means of tracing at some future period the natural history of these extraordinary Quadrumana; and if proper names are given

to the individuals described it should be less for the purpose of designating them as species, than to mark the differences which distinguish them individually.

The name of *Mongous* is vulgarly applied to all the Lemurs whose colour is more or less of an olive brown. But it is by no means certain that it has as yet been employed to designate a species whose characteristics and limits have been correctly determined.

The size of this animal, from the sole of the foot to the most elevated part of the body, is a little more than a foot. From the origin of the tail to the occiput is about a foot, and the tail itself is nearly two and twenty inches long. The hands, both anterior and posterior, have five fingers, the thumb being perfectly distinct, and much more developed on the hinder than the fore-feet. All the nails are flat, except that of the index of the hind hand, which is crooked and very sharp. The nostrils open at the extremity of the muzzle exactly in the manner of those of dogs. The under jaw is less advanced than the upper, and the tongue is soft. The ears are rounded externally, and resemble those of man in having the opening of the auditory conduit of considerable dimensions. Something resembling mustachios is seen at the under jaw, on the sides of the upper, and under the eyes. If these animals have any peculiar organs of touch, it must reside in the fingers, the skin of which is extremely delicate. The fur is remarkable for its fine woolly hairs, and the whole body is covered by it nearly in an equal proportion, except the face and hands.

The teeth of the Mongous have a peculiar character. There are six incisors in the lower jaw, compressed together and directed forwards, two canines compressed laterally, smaller than those in the other jaw, and five molares with pointed tubercles. In the upper jaw, are four straight incisors, separated from each other in pairs, two canines

laterally compressed, trenchant, and sufficiently long to extend to the mouth when it is closed. There are also five molares above.

The general colour of the fur is a fawn-coloured brown, sprinkled slightly with olive or yellow, and this colour is nearly as uniform in the upper parts of the body as the under. The tail is black at the extremity, and the head of the male is altogether of the same colour, while that of the female is gray. The cheeks are furnished with whiskers of a fine orange, the face, ears, and interior of the hands are of a violet hue; the female is smaller than the male, more yellowish in the shade of its fur, and differing slightly in the form of the head.

The Mongous appears to be an animal of very moderate intelligence, extremely inoffensive and remarkably timid. They are easily tamed, but not capable of attachment. They may be accustomed to come when called, by attaching to their name, the allurement of some article of diet of which they are fond. Their life is partly nocturnal. They pass a considerable portion of the day in sleep, rolled in a ball, having their large tail passed between their hind legs and twisted finally round the neck. Like the other Lemurs, the Mongous are essentially formed for climbing trees and jumping. They make prodigious bounds and will traverse the whole extent of a tree with astonishing rapidity. They will jump ten feet from the ground without any apparent effort. But they walk on a flat surface with great difficulty. The actions of these animals are not dissimilar to those of monkeys. They carry their food to the mouth with their hands, and notwithstanding the elongation of the muzzle they drink by suction. When tranquil, their voice is a feeble grumbling, but they utter very strong and grave sounds when frighted. Then they roar in concert, producing a most insupportable noise. When two Mongous are accustomed to each other, they live in peace,

and sleep together in an embracing posture, otherwise they fight desperately, biting, and tearing out each other's hair with their hands. F. Cuvier had two pairs of these animals not accustomed to each other, and whenever he removed the partition which separated their cages, they were seized with an indescribable fury. They uttered sharp and interrupted sounds, but rapidly successive, and would have done each other serious injury but for the intervention of the iron bars. They were fed on boiled roots, fruits, bread and milk, and kept in an uniform temperature of from twelve to fifteen degrees. By these cares, and an attention to cleanliness they were preserved in tolerable health, and seemed less sensible to captivity, and less affected by the inclemency of climate, than the monkeys in the same collection.

The pointed nail, which we have noticed these animals to possess, on the fore-finger of the hind hand, they never use except for the purpose of introducing into their ears, where they keep it for some time without any evident reason. It also appears that they use their lower incisors to scratch and cleanse their feet, a service which they render mutually to one another, and which seems to be one mode of expressing their mutual satisfaction.

The Mococo is by far the most beautiful of the Lemurs, and not less distinguished for its confiding and affectionate character. The tail, coloured with alternate rings of black and white, is one of its most distinguishing external peculiarities; an organic characteristic in the Mococo, well worthy observation, is, that the palm of the hand is extended by a straight line concealed under the hair, as far as the middle of the arm, where it appears uncovered. By means of this, when the Mococo extends his arm, the fingers necessarily close; and this accounts for the facility with which these animals suspend themselves from the branches of trees. Buffon is mistaken in supposing this Lemur to have

a rough tongue like a cat. It emits a sound occasionally like the purring of that animal, whence its Linnæan appellation is derived. In the structure of the teeth, &c., the Mococo does not differ from the Mongous. Its elevation from the ground is about a foot, and the length from tail to occiput is the same; the tail itself is about seven inches.

The slow Lemur or Lori, (*Lemur tardigradus*) is also called the Poucan, which is its name in Malay. Its indolence and slowness are almost incredible. It walks with constraint, and even when in haste, its gait does not exceed a creeping pace. It is not, however, devoid of intelligence, and appears susceptible of some education. D'Obsonville speaks thus of one in his possession: "At the approach of night it would rub its eyes" (for it sleeps all day) "then looking attentively on all sides it would walk over the furniture, or rather over the cords which I had disposed for that purpose. Milk and very ripe fruits were not disagreeable to it, but its chief food consisted of small birds or insects. If it perceived any thing of this kind, which I used to amuse myself by placing at the extremity of the room, it would approach with a lengthened and circumspect pace, like one who was groping his way in the dark. Arrived within about a foot of its prey, it would stop; then raising itself upright, would advance in that posture, stretching out its arms gently, and would suddenly seize the object, which it instantly strangled." Sir William Jones's interesting account of a domesticated specimen of this species has been too often told to bear repetition.

The Galagos, are a sub-genus, as yet but moderately known. Their discovery has served to fill up an hiatus between the Tarsiers (so called from the excessive length of the tarsus) and the preceding division of the Lemur family. The Galago resembles the Tarsier in the

1. THE LORIS.

LORIS GRACILIS.

2. THE GALAGO.

LEMUR SENEGALENSIS.

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organs of sense, which are of the same size. The hind feet are likewise much longer than the fore. This disproportion is not the result of any essential change in the constituent parts of the foot; for in the Galago as well as in other Quadrumana, the tarsus is composed of nine small bones, and the metatarsus of five; two of the first, the scaphoïd and the calcaneum, are singularly prolonged: but no other change results in the relations and use of the other bones.

The Galago seems to be insectivorous, and from the largeness of the eyes probably pursues his prey by night. The couch of the ear is large, membranous, and naked, and the consequent sensibility of this organ doubtless assists the animal greatly in distinguishing his prey. The inequality of the extremities enables him to jump with extreme agility.

The Galagos (according to Adanson) have much of the manners of monkeys and squirrels. They are in general gentle, perch constantly on the branches of trees, where they catch insects with their hands and devour them quickly. They make nests in the branches of trees, and cover a bed with grass and leaves for their little ones. With the natives of Senegal they are an article of food.

In three forests in the deserts of Sahara, consisting of gum-trees, from their abounding in that tree which produces the gum-senegal, the Galagos are constantly found, and brought to Europeans by the Moors who trade towards the coast. They call them the animal of the Gum. Of this product the Galagos eat abundantly, but their taste for insects is more decided.

When they sleep the Galagos close their ears, which are then folded up, so as to be scarcely visible, but on the least noise they open again. This is a property also of many of the bats. The Galago is about seven inches long, the tail about nine.

P. S. M. Geoffroi St. Hillaire considers the Fennec of Bruce called also Zerda, Canis Cerdo Megalotis, *&c.*, as, if not of the same species as the Galago of Senegal at least of the family of the Galagos. It is impossible within our limits to follow this eminent naturalist through the detail of his arguments. He seems, however, from a review of the accounts of Bruce and others, to establish the following affinities between them.

"Both are of the same length, the ears one and half as long as the head, the eyes large, the head spheriodal, the muzzle slender and short; both are of the same colour; both nocturnal; both live in trees and nestle in their trunks; and both inhabit regions of Africa, which if not very neighbouring, are of the same climateric constitution."

This writer establishes four species. 1. The Galago of Madagascar. 2. Galago Murinus, "Little Maccauco," brown, "Lemur Murinus," Pennant. 3. Galago with tufted tail, (crassicandatus). 4. Galago of Senegal, (Lemur Galago. Shaw,) to which he thinks the Fennec should be added, to form a fifth species.

Some additional Remarks on the Order Quadrumana in general, and more especially on the Nomenclature of that Order.

Having gone through the various species of the quadrumana, and omitted nothing which we deemed at all likely to interest or instruct our readers respecting the conformation, instincts, habits, natural disposition and degree of intelligence belonging to each, we should yet esteem our task unfinished without a few additional observations, chiefly relative to the systematic arrangements of some naturalists and the different nomenclatures of this order, which had been generally adopted previously to the publication of the "Regne Animal." It may be thought,

perhaps, that this part of the subject should have been discussed at the commencement, rather than at the conclusion of our labours on the quadrumana, and truly, were we engaged on an original work, on this department of natural science, such an objection would not be without its weight; but the restrictions under which we are necessarily laid by the duty of translators, render our present proceeding in some degree unavoidable; and, after all, the allocation of a supplementary essay of this kind may be deemed an affair of but minor consequence as far as utility is concerned.

The term *Ape* was originally applied to signify an animal without a tail; with the face somewhat flattened, and with teeth, hands, fingers, and nails resembling those of man. It was also supposed, like the human species, to be capable of walking in an erect posture, nay, that method of locomotion was presumed to be its natural and habitual gait: how far this opinion was well founded we have already seen. This definition, which was derived from the external character of the animal, and its estimated relations with man, excluded all creatures, with tails, all with protruded visage, or elongated muzzle, all with curved, crooked, or pointed nails; and all, in fine, which evince, from the character of their conformation, an habitual disposition to walk on all-fours.

The ancients appear to have been acquainted but with a single animal to which this definition would apply, which was the πιθηκός of the Greeks, and the *Simia* of the Latins. On this animal, Aristotle, Pliny, and Galen, have rested all their physical comparisons and structural relations of the ape with the human species. One point, however, seemed to stagger them a little. Notwithstanding the strong exterior resemblance of the pitheeus to mankind, and the still stronger traits of such analogy in internal conformation (stronger they doubtless appeared in the then infancy of

anatomy, both human and comparative), there was yet a very striking difference of dimensions between the two species. This was so remarkable, that even had the ape exhibited a nearer approach to human organization, the ancients would have regarded him but as an homunculus, an unfinished dwarf, or a feeble pigmy, capable at best of warring only with the cranes, while it was the proud privilege of man to tame the elephant and subdue the lion.

But when the eastern Archipelago, the regions of India, and southern Africa, were open to the researches of travellers, another animal was discovered resembling the ape already known, but which the lovers of the marvellous had invested with the attributes of human stature, strength, and sagacity. This was the *orang-outang*, which from its possession of the characters above-mentioned came within the limits of the definition, and was accordingly named an ape, by Linnæus and other writers, and subsequently by Buffon.

A third animal, wanting a tail, and exhibiting a general resemblance of structure to the two last, in spite of the immeasurable disproportion of the arms, seemed entitled to the same generic epithet, and accordingly received it. This was the *Gibbon* or *Simia Lar*, with its varieties the *Leucisca* and *Simia Lar minor*.

These species constituted the entire family of apes in the time of Buffon, who nearly confounded together the orang and the Chimpansé, and formed from the combinations of his own fancy an animal which he called the Pongo.. The Pithecus, which we have seen is no other than the Magot, or Simia innuus, has no business among the apes, and the real Pongo, which has all the essentialities of a baboon, is yet distinguished by that want of tail which was assigned by former naturalists as the characteristic peculiarity of the ape kind. This, if any evidence indeed were wanting on the subject, is sufficient to demonstrate the absurdity

of selecting as a generic character, the absence or presence, or extent of an organ, so slightly connected with the essential organization, and so trifling influential, (in the old world at least,) on the habits of these animals. Still, we think, that the term ape may, with due qualifications, be conveniently retained as a designation of the orang tribe. It is an English word, and familiar to English ears, and if right notions be attached to its application, it will be more eligible as a generic name, than any foreign or factitious appellation.

After the Apes, came another family of quadrumana which were distinguished by the generic title of Baboons. Buffon distinguishes this family by the short tail, the lengthened visage, the large projecting muzzle, the longer canine teeth, and the posterior callosities. Thus, as he imagined, were excluded from this family, all monkeys without tails, all the guenons, all the sapajous and sagoins, and all the makis, loris and other quadrumana with slender and pointed muzzles. Of the correctness of this definition and the justice of some of these exclusions, our readers are already in possession of the materials of judging.

The ancients appear to have had no proper name for the baboons. Aristotle alone seems to have designated one of this family under the appellation of *Simia Porcaria*, and even his notice of the animal is but indirect. The Italians were the first who gave it the name of *babuino*, the Germans called it *bavion*, the French *babouin*, and modern Latin writers on zoological subjects have formed from these the word *Papio*, which now serves to designate some of the species of this sub-genus. Buffon acknowledges but three species of baboons: the Papio, or great baboon, the Mandrill, and the Ouanderou.

The Magot, which is nothing but the Pithecus of Buffon in an adult state, as the Pithecus itself was no other than a young Magot, this writer considers with much ap-

parent justice, as forming an intermediate link between the apes and baboons. From the first it differs by the elongation of the muzzle, and the size of the canine teeth; from the second, by possessing only the rudiments of a tail. Still the main points of its conformation and character approximate more to those of the baboons, and fully justify Cuvier in placing it among them, though at the head of that family.

All the animals of which we have hitherto been speaking in this memoir, the Count de Buffon presents to his readers in the following order. The Ourang Outang, or *Pongo*, is the first ape; the Pithecus, the second; the Gibbon, the third ape, but deformed; the Magot, which he also calls Cynocephalus, is either the fourth ape, or first baboon. The Papio, first baboon; the Mandrill, sscond baboon, and the Ouanderou, the third. And this order, he tells us, is neither arbitrary nor fictitious, but founded on the graduated scale of nature herself.

After the apes and baboons come, according to the naturalist whose system we are now explaining, the *Guenons*. This term, a word of the old French idiom, is used by the Count and others to signify such animals as resemble apes and baboons, but which have tails as long or longer than the body. In popular usage, this French term is employed to distinguish all the smaller monkeys, while the word *Singe* is applied to the larger. It was also used to designate the female of the ape kind. But more anciently in French the words *Singes* or *Magots* were used to signify the tail-less monkeys, while *Guenon* or *Mone* was the generic name for such as had long tails. This word *Guenon*, may, perhaps, be derived from the *Kébos* or *Képos* of the Greeks, as well as the word Gibbon. These Guenons are distinguished from the apes and baboons by inferiority of strength and size, and length of tail, and from the makis or lemurs, by the absence of the pointed muzzle, and their having but four

instead of six incisors. There are, according to the Count, nine species of Guenons: 1. The Macaques; 2. the Patas; 3. the Malbroucs; 4. the Mangabeys; 5. the Mone; 6. the Callitrix; 7. the Moustac; 8. the Talapoin; 9. the Douc. The imperfectness of this enumeration we need not advert to.

The ancient Greeks knew but two of these Guenons, the Mone and the Callitrix, which were originally natives of Arabia, and the northern part of Africa. The others, which belong to the southern provinces of Africa and India, were of course entirely unknown in the time of Aristotle. The generic name of Kébos was given to the Mone, by that great philosopher and others, from the variety of colours which it exhibited.

Two or three ages after Aristotle, we find two new names in Greek writers, *callithrix* and *cercopithecos*, both relative to the Guenons or long-tailed monkeys. In proportion as the earth was discovered, and advances were made towards the southern regions of Africa or Asia, new tribes of animals were found, and other specific varieties of the monkey race observed. As the majority of these last were not conspicuous like the Kébos for variety of colours, the Greeks gave to them the general epithet of Cercopithecos, simply to designate them as having long tails. But having remarked among them, a Guenon of a greenish fur, and lively colour, they bestowed upon it the name of *Callithrix* which means "beautiful hair." This animal, in fact, is found in the southern parts of the ancient Mauritania, and in the countries near the Cape de Verde.

The Count fills the interval between the baboons and guenons with the Maimon as an intermediate species. He has a general resemblance to the Guenons, says this writer, but with the large muzzle and short tail of the baboons: is a native of Sumatra, and is the only monkey of either of these families, whose tail is destitute of hair; on this ac-

count he has been designated by travellers as the pig-tailed or rat-tailed monkey. On this subject we refer our readers to what has been already said in that part of our supplement relating to the baboons.

Finally, the Count proceeds to the monkeys of the New-World, which he thinks with reason, have been very injudiciously confounded, under the generic names belonging to those of the ancient Continents. On the first discovery of America, it was never suspected that these immense regions contained none of the animals peculiar to Africa and India. Creatures were found there with four hands and with fingers, and this relation was deemed sufficient to entitle them to the appellations of apes and monkeys. After noticing the different characters which separate them from the monkeys of the old world, Buffon divides them into two genera, distinguished from each other by the prehensile, and the non-prehensile tail. These are the Sapajous and Sagoins; of the former he admits six or seven species; of the latter six only, which he deems for the most part varieties.

On the whole, he reduces the monkeys to thirty species: *viz.*, three apes, and one intermediate between the apes and baboons; three baboons, and one intermediate between the baboons and guenons; nine Guenons, seven Sapajous, and six Sagoins. Any of the rest known at the period in which he wrote, he considers as merely varieties. Such, in brief, is Buffon's arrangement of the Quadrumana, Lemurs excepted, respecting which we deem it unnecessary to add any thing from him, or any one else, in addition to what we have already given.

The general divisions of this arrangement do not differ materially from the Linnæan, the principal deviations being allocation of some of the species.

The critical observations of Buffon on the nomenclature of the monkeys, and the methodical distribution which he

made of these animals, prepared the way for labours of the same description, more extensive, and more satisfactory as being commensurate with the progress of discovery and the enlargement of natural knowledge.

Erxleben, in his "*Systema Regni Animalis*," published in 1778, divided the monkeys into five genera, which we present to the reader in the following order, with their principal characteristics.

1. Simia. No tail.

The Orang-Outangs and many Guenons.

2. Papio. Short tail. Cheek-pouches.

The Baboons.

3. Cercopithecus. Long-tail, not prehensile, Callous posteriors.

The Ouanderou, the Macaques, &c.

4. Cebus. Prehensile tail. Hairy buttocks.

The Alouattes, the Sapajous, &c.

5. Callithrix. Long tail, not prehensile.

The Sakis, Sagoins, &c.

But in modern times the men to whom natural science is most deeply indebted, those whose researches have really the character of originality, are Cuvier, Geoffroi, Lacépède, and Audebert. There is a paper in the *Journal de Physique* entitled "A Memoir on the Orang-Outangs," from the pens of our illustrious author and M. Geoffroi, replete with the most valuable observations on the subject now under consideration, which has served, and must always serve, as the basis of every subsequent classification of the numerous and varied family of the monkeys. As we have no doubt but that our readers will thank us for its insertion, and as it is calculated to throw a more complete light on the subject of the present volume, we have translated it entire.

"The monkeys, those singular beings, in whose formation nature would seem to have amused herself in rudely caricaturing the human figure, have sometimes embarrassed

the philosopher, by the difficulty of fixing a limit between the actions which result from a similarity of their organs with ours, and such as emanate with ourselves, from a superior principle of intelligence.

"They do not, however, less embarrass the naturalist, by the difficulty of distinguishing them accurately from each other, and of grouping their different species, according to their genuine and natural relations.

"The monkeys, as well as the parrots and other imitators of mankind, people the forests of the torrid zone in either hemisphere. The first animate the woods by their gambols, and by their petulant and ludicrous motions, while the second cause them to resound with their shrill, confused, and piercing cries. Both are alike astonishing by the variety of their species, and the number of individuals belonging to each.

"The abundance, and the nutritious quality of the fruits from which they derive subsistence, must of necessity produce considerable fecundity, and cause a rapid reproduction of these animals: and as the monkeys, as well as the parrots, have a capacity of escaping from the majority of savage beasts, if not by flying, at least by climbing the trees, their usual habitation, and by jumping with incredible agility from branch to branch, and from tree to tree; it follows that they have fewer causes of destruction to fear than the rest of the feebler quadrupeds. From these two causes proceeds the wonderful multiplication of their various species.

"It is a general law of nature, that the number of species in every genus is pretty nearly in an exact ratio with the degree of fecundity peculiar to each species. This is the case, whether the subdivisions which we term species are only various degenerations from one original stock, multiplied in proportion to the greater or less frequency of parturition, or whether many among them be sprung from

the junction of kindred species, the efficacy of which junction must materially depend upon the *vis generatrix* of the mingled kinds. The orders rodentia and carnivora furnish us with numerous applications of this law, as well as the Quadrumana.

"The very productive character of the monkey race ought therefore to give rise to considerable multiplication of the species, and accordingly, we ascertain, on investigation, that this is the real fact. In spite of the assiduous researches of the greatest naturalists, it is seldom that we survey a moderately-numerous collection of these animals without discovering some new species, or some varieties hitherto unknown. It is also far from doubtful, that if their differences were more apparent, if they were constituted for example by marked and striking traits of colour, our cabinets of natural history would be still better furnished with such varieties than they are at present. But trivial variations in the shades of gray, of brown, or of yellow, slight changes in the length of the muzzle, the form of the cranium, or the proportions of the members, were insufficient to command the attention of the generality of travellers. The observation of such men is arrested only by extreme differences, and it is a mere chance that the animals which they import, evince, on being subjected to the inspection of the naturalist, such characters as are peculiar to the species already known, whatever general similarity a superficial observer may imagine to exist between them. The frequent recurrence of such cases, evidently proves how very numerous the species must be, and also what farther accessions to their number may result from enterprising researches undertaken with a view to their discovery. The respective examination which we have made of stuffed or living specimens of monkeys, has sufficed to convince us of the utter impossibility of properly illustrating

their natural history, without seeking for characters better defined, and more easy of detection, than those hitherto in use, on which to establish the distinction of species.

"But as the human faculties are too limited to make a simultaneous comparison of a great number of objects, as the mind proceeds only by the way of generalization, and has scarcely acquired any ideas, but it begins to unite them in groups, and then again forms other groups more comprehensive, for the purpose of descending by degrees from these general, to more particular subdivisions, we have thought proper to begin by making in this immense family of the monkeys a sufficient number of separations; that they may not produce false ideas, that they may not unite together very different species, or separate those which are similar, it was necessary to seek the basis of such divisions in the most important differences of conformation, in those which are most intimately influential on the whole animal system.

"We could not employ the generic cases of preceding zoologists, which are little less defective than their specific characters. The tail, for instance, this member, or rather this appendage, superfluous and foreign to the body, must of necessity prove a very defective basis of distinction. In point of fact, there is a Mandrill found without a tail. The Magot, which has none, approximates closely to the Macaques which have this organ. The case is similar with the posterior callosities; if we adopt them as an essential character, the Guenon, which is named *Douc* (*Simia nemæus, Lin.*) would come after the Orangs, and the Gibbon would be removed from their vicinity.

"The cheek-pouches, as organs accessary to nutrition, are not without importance. They serve as the basis of a division, which to be sure does not forcibly sunder kindred genera, but which fails, however, of uniting them under

the totality of their relations. The Alouattes, for instance, are infinitely more distant from the Orangs, than from the Guenons, though these last have the cheek-pouches, and the two former genera are both devoid of them. If, then, the cheek-pouches are to be employed, it must be as a secondary, not as a primary character.

" Linnæus, at first, founded his division only on the tail. This appendage was wanting in his apes, short in his baboons, long in his cercopitheci, or monkeys.

" Buffon added three characters, cheek-pouches, callosities, and prehensile tail. By these means, he separated the Sapajous from the Guenons, and the Sagoins from the Sapajous. Of the three families of Linnæus he made five, which Schreber, Erxleben, and Gmelin have adopted either as proper genera, or subdivisions of genera.

" This was, in fact, the most natural division which then existed. But even at the period of its formation, there were exceptions, and some species were arranged in it, contrary to nature. We have already noticed the Magot, and the Douc. There are other examples. The Baboon, properly so called, has not a short tail, as Buffon imagined, from having seen only a mutilated individual. Its tail is as long as those of the Guenons. It ought, therefore, according to this system, to be ranged among them, though so very different in all other points.

" The Guenons themselves form two very distinct families, which Buffon could not separate by the characters which he employed.

" The Alouattes should be removed from the Sapajous, from which they differ both in habits and configuration This was impossible on the system of Buffon.

" Besides these ancient defects, the newly-discovered species have given rise to additional exceptions. The animal described by the scientific society of Batavia, under the

name of Pongo must be ranged among the baboons. Nevertheless he wants the short tail by which Buffon characterizes that family.

"It must be owned that it was not very easy to find better distinctions. All the organs of a superior character have a general resemblance in the monkey races. The fingers, the teeth, and tongue, appear to have been formed according to the same type. We think, however, that the various elongations of the muzzle may be of some utility, if precisely determined. In truth it is by these, that the proportion between the volume of the cranium and that of the face is established, a point of no mean importance in the animal economy; for the size and convexity of the cranium indicates sensibility, in a similar proportion as the elongation and largeness of the muzzle indicates brutality.

"We observe in the various races of mankind, as well as in the different species of animals, a similar series of relations between the projection of the cranium and the degree of intelligence, or of that exquisite sensibility, that mobility in the organs, which in all probability forms the principal basis of those distinctions which exist between man and man.

"We rarely find the tribes distinguished by a depressed forehead and prominent jaws, furnishing examples of intellectual power equal to the generality of Europeans. So accustomed, indeed, are we to this connexion between the proportions of the head, and the faculties of the mind, that the rules of physiognomy founded upon it, have become matter of common opinion.

"Every one is aware that Camper was the first to remark that a trifling inflexion of the line which terminates these proportions was what constituted the ideal sublimity realized by the Grecian chisel.

"The importance of this proportion of the cranium to

the face holds equally in relation to the different species of monkeys, as it does to the different races of mankind.'

" The Orangs, with a round and vaulted cranium, with a short and flattened visage, surprise us by their gravity, their address, and their intelligence.

" The Sapajous, with a short face, and cranium slightly flattened, are lively, gay, and frolicksome. They amuse by their tricks, and please us by their gentleness.

" The Guenons, which have a similar configuration of skull with the Sapajous, have likewise many other relations with them, in character and manners.

" The Macaques, and the Magots, in which the muzzle begins to elongate, exhibit considerable petulance, and are far from tractable.

" The Alouattas with elongated muzzle, but cranium of tolerable convexity, are merely wild and mischievous. Their howlings are frightful, and they cannot be tamed.

" Finally, the Mandrills, or baboons, animals with canine muzzles, not less ugly in form, than disgusting from the colour of their faces, which have the appearance of having been recently burned, are all of the most incorrigible ferocity. They present, as it were, living pictures of the most revolting brutality, and the most abandoned vice.

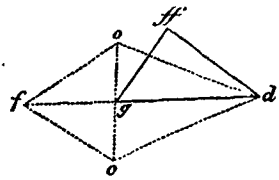
" We have followed pretty nearly the same method which Camper has observed in his researches on the physiognomy of the various races of mankind. We have only endeavoured to describe the principal lines in a manner still more precise and rigorous.

" One named the *horizontal* is supposed to pass through the centre of an imaginary line drawn from one auricular foramen to the other, and through the edge of the incisive teeth.

" The other is the facial, which proceeds from this last

point, to the projection formed between the eye-brows, or over the root of the nose, by the frontal line.

" The angle intercepted between these two lines is the facial angle.



" Take with a compass the distance between the two auricular foramina. Carry it to *o*, *o*. Take the distance from one of the auricular foramina to the middle of the edge of the incisives: make with this distance *o*, *d*, the isosceles triangle *o*, *o*, *d*; take in like manner the distance between the auricular foramen and the projection of the forehead, and make the triangle *o*, *q*, *f*.

" Take the distance *d*, *ff*, between the edge of the incisives and this same projection, with *g*, *f*, and *d*, *ff*, make on *g*, *d*, the triangle *g*, *d*, *ff*, the angle *g*, *d*, *ff*, will be the facial angle.

" If this operation be once performed for a species in each genus, no future mistake can ensue, and a simple glance will be sufficient to distinguish them.

" It is principally the facial angle which we use to distinguish our genera.

" We consider also the palatine angle which is formed by the meeting of the horizontal line with another line supposed to divide into two equal parts the plane of the alveolar arcade, and which we name the *palatine line*. When these two last lines are parallel, which is often the case, the palatine angle is *o*.

" In applying these measures to the crania of different quadrumana, we have obtained the following results:

" The Orang-Outang of Camper, the Jocko and the Gibbon of Buffon had the facial angle from 56° to 63°. The Sapajous, and the Sagoins of Buffon, with the exception of the Alouatta, have this angle about 60°. The Guenons or Cercopitheci have it 50 and a few degrees. The

COMPARATIVE VIEW OF CRANIA OF MONKEYS.

AND OF THE DECLINATION OF THE FACIAL LINE

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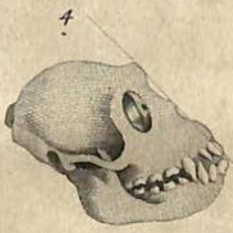

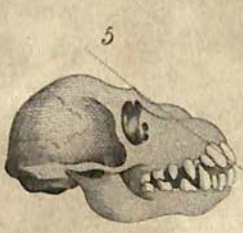

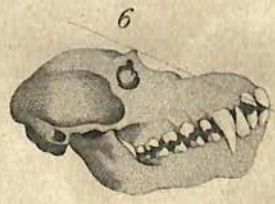

1 The Apes properly speaking

2 The Sapajous

3 The Guenons

4 The Macaques

5 The Magots

6 The Mandrills

7 The Howlers

London, Published by G. B. Whittaker. Febr. 1825.

Magots and Cynocephala from 42° to 45°. Finally, in the Mandrills and Alouattes it seldom passes 30°.

"It has been made evident that the divisions founded upon this angle are by no means contrary to the natural order. For in fact, the three first species which approximate to man in this respect (his facial angle as is well known being about 70° at least), approach him also in other points more nearly than any species beside. Their hyoïd bone, like his, is slender, their liver divided into two lobes only, and their cæcum provided with a vermiform appendage.

"Moreover the organic differences are found to follow pretty closely the law of this angle: for example, the Magots and Cynocephala have the hyoïd bone of the form of a buckler with a little sac beneath. The Mandrills have only a sac somewhat larger, while in the Guenons and Macaques it is entirely wanting, as also in the Sapajous.

"The Alouattes, which are completely isolated by the magnitude of the palatine angle, for it is 23° in those animals, have likewise a structure of the larynx altogether peculiar to themselves.

"But it has also been sufficiently apparent to us that, though this character should be considered as the principal one, it ought not to be employed alone, because it would not serve as a perfect division for the different families: we have therefore combined with it some others, with which the number of the molar teeth, and the presence or absence of a bony crest above the eye-brows have furnished us.

"From these investigations have resulted seven different genera, of which the following is a tabular synopsis:

Mammalia.

Order 1. *Quadrumana.*

Section the First.

Four incisive teeth above and below. Monkeys.

" Genus I. Orang, *Simia.* Short muzzle; facial angle 60°, rounded head, four or five molar teeth; no tail nor cheek-pouches; sometimes slight callosities.

" The Orang-Outang, the Jocko, and the Gibbon.

" Genus II. Sapajou, *Callithrix.* Short muzzle; facial angle 60°; flattish head; prominent occiput; six molar teeth; long tail, often prehensile; no cheek-pouches, no callosities. Nostrils very much apart.

" The Sapajous and Sagoins of Buffon (*cebus* and *callithrix* of Erxleben,) the Alouatte and the Ouarina excepted. (*Simia beelzebut et seniculus.*)

" Genus III. Guenon, *cercopithecus.* Short muzzle; facial angle 50° and more; head slightly flattened; occiput not very prominent; five molar teeth; no superciliary crest; long tail not prehensile; cheek-pouches, and very frequently callosities.

" The Guenons of Buffon with round heads: the *Simiæ, rolowai, diana, talapoin, petaurista, mona, rubra, nemæus, sabæa, cephus, æthiops, nasica,* (*Linn.*)

" Genus IV. Macaque, *pithecus.* Muzzle tolerably short; facial angle 50°; flattened head; superciliary crest; five molar teeth; long tail, not prehensile; cheek-pouches; most commonly callosities.

" The Guenons of Buffon, with short muzzle and depressed nose, some of his baboons; *simiæ veter, silenus, faunus, cynomolgus, sinica,* (*Linn.*)

Genus V. Magot, *cynocephalus.* Elongated muzzle; facial angle 40°; flattened head; frequently superciliary

crest; five molar teeth; tail not prehensile and sometimes very short; cheek-pouches; callosities.

"The Magot, (*Simia Inuus*,) the Papion, or dog-headed monkey, for these two species make but one, (*Simia Sphinx*,) and *Cynocephalus*, (Linn.) the *Simia Hamadryas*.

"Genus VI. Baboon, *Papio*. Muzzle considerably elongated; facial angle 30°; head flattened; superciliary crest; five molar teeth; short tail; cheek-pouches; large callosities.

"The Mandrills and the Choras, *Simia Maimon and Mormon*, the Pongo of Batavia

"Genus VII. Alouatte, *Cebus*. Oblique visage; facial angle 30°, palatine 25°, pyramidical head; six molar teeth; long prehensile tail; no cheek-pouches, nor callosities.

"The Alouatte and Ouarina of Buffon, *Simia Beelzebut et Seniculus* (Linn.)"

Such was the first classification of this part of the quadrumana formed by our author, in conjunction with M. Geoffroy. Subsequently in his "*Tableau Elémentaire de l'Histoire Naturelle des Animaux*," he revised his former labour, making some necessary alterations in the indication of the facial angle, and suppressing the genus Magot which he united with the Macaques, simplifying also the characters of those genera which he termed families. The following is a view of the system thus re-modified.

I. The Apes, properly so called: with round head; muzzle very slightly prominent (facial angle 65°), without tail or cheek-pouches.

The Orang-Outang, (*Simia Satyrus*.)

II. The Sapajous. Head flattish, muzzle not very prominent (60°), long tail, without cheek-pouches; hairy buttocks; nostrils pierced at the sides of the nose.

The Coaïta, (*Simia Paniscus*.)

III. The Guenons. Head flattish; muzzle slightly prominent (60°); long tail, not prehensile. Cheek-pouches; callous buttocks.

The Mone, (*Simia Mona.*)

IV. The Macaques. Flattened head; prominent muzzle (45°), cheek-pouches; posterior callosities.

The Macaque, (*Simia Cynomolgos.*)

V. The Baboons. Long muzzle (50°), cheek-pouches, callous buttocks, short or no tail.

The Mandrill, (*Simia Maimon.*)

VI. The Alouattes. Pyramidical head, lower jaw considerably elevated, long prehensile tail, without cheek-pouches or callosities.

The Alouatte. (*Simia Beelzebut.*)

Lacépède in his table of the Mammalia appears to have followed pretty nearly the same division. His method is this:

QUADRUPEDS, PROPERLY SO CALLED.

FIRST SUBDIVISION.

The fore-feet in the form of hands.

QUADRUMANA FIRST ORDER.

Teeth incisive, canine, and molar.

1. Ape. *Simia.*	Four incisive teeth in each jaw; facial angle 65°, no cheek-pouches nor tail. The Satyr Ape. *Simia Satyrus.*
2. Guenon. *Cercopithecus.*	Four incisive teeth in each jaw; facial angle 60°, cheek-pouches; tail; callous posteriors. Long-nosed Guenon. *Cercopithecus Nasica.*

3. Sapajou. *Sapajou.*	Four incisive teeth in each jaw; facial angle 60°; no cheek-pouches; prehensile tail; hairy buttocks. Sapajou. *Sapajou Paniscus.*
4. Sagoin. *Sagoin.*	Four incisive teeth in each jaw; facial angle 6°; no cheek-pouches; tail not prehensile; hairy buttocks. Sagoin Ouistiti. *Sagoin Iacchus.*
5. Alouatte. *Alouatte.*	Four incisive teeth in each jaw; pyramidical head; no cheek pouches. Prehensile tail; hairy buttocks. Howling Alouatte. *Alouata Beelzebut,*
6. Macaque. *Macaca.*	Four incisive teeth in each jaw; facial angle 45°; cheek-pouches; callous buttocks. Macaque Magot. *Maccaca Inuus.*
7. Pongo. *Pongo.*	Four incisive teeth in each jaw; facial angle 30°; cheek-pouches; posterior callosities; no tail. Pongo Borneo. *Pongo Borneo.*
8. Baboon. *Cynocephalus.*	Four incisive teeth in each jaw; facial angle 30°; cheek-pouches; tail; posterior callosities. Baboon Mandrill. *Cynocephalus Maimon.*

On comparing this distribution of the monkeys with that of Cuvier and Geoffroy, we perceive that Lacepède has established two additional genera, the Sagoin and the Pongo, that he places the Guenons before the Sapajous; that he has united, in imitation of Cuvier, the genus of the Magot with that of the Macaque; and that the Alouattes do not

terminate the division of the monkeys, but precede the Macaques, the Pongos, and Baboons, which form the last families.

Audebert, in his magnificent work on the monkeys, differs somewhat from Buffon in his method of arrangement. He divides the Quadrumana into six families. The four first present a view of the species belonging to the ancient continent, the character of which is to have the partition which separates the nostrils extremely slender, so that their openings are nearly contiguous and underneath.

The first family comprehends those monkeys which, by the conformation of their head, approximate the nearest to the human species. Such are the Orang-Outang, Gibbon, *&c.* They have no tail.

This family he divides into three sections.

The second and third families correspond to a part of the Macaques and to the Baboons of Cuvier

The fourth contains the Guenons.

The monkeys of the two last families are peculiar to the new world, and are easily distinguished from those of the old, by the thickness of the partition which separates their nostrils. This partition is as large or larger than the measurement of the nostrils in the greatest width of their diameter.

The fifth family is devoted to the Sapajous, whose tail is revolute and prehensile.

The sixth, in fine, is composed of the Sagoins, which have the tail flexible, and not prehensile.

For a list of the species of these numerous orders, with their synonyma, *&c.*, we must refer to the Synopsis.

END OF THE FIRST VOLUME.

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